RHINOCEROS AND ELEPHANTS FIGHTING.

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GOLDSMITH'S

2

NATURAL HISTORY;

WITH NOTES

FROM ALL THE POPULAR TREATISES
THAT HAVE BEEN ISSUED SINCE THE TIME OF GOLDSMITH;

COLLECTED WITH THE UTMOST CARE.

COMPRISING

A MASS OF INFORMATION AND REFERENCE;

FORMING

A COMPLETE VADE-MECUM OF MODERN DISCOVERY IN THE
SCIENCE WHICH IT ILLUSTRATES.

WITH A LIFE OF OLIVER GOLDSMITH,

BY GEORGE MOIR BUSSEY.

> "Some one told Dr. Johnson that Goldsmith was engaged in writing a work on Natural History 'Is he so engaged?' said the great lexicographer.—'Then he will produce a work on the subject as pleasing and delightful as a fairy tale'"

By HENRY INNES,

AUTHOR AND EDITOR OF VARIOUS WORKS ON EDUCATION.

LONDON:—JOHN LOFTS, 262, STRAND.

1816

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LIFE OF OLIVER GOLDSMITH.

THE chequered life of the author of the 'Vicar of Wakefield,' unlike the lives of professional literary men in general, abounds in incident, and is replete with entertainment and instruction. It is a chapter in the History of English literature, which the student will peruse and reperuse with feelings of mingled delight and pain; but which he must needs linger over, if he desires to understand the character of the age which the writings of Goldsmith contributed so greatly to enlighten, refine and amuse. The following—the chief materials for which have been derived from the laborious Biography of the Poet, by Mr. Prior—is necessarily limited to a brief sketch.

Oliver was the fifth child of the Reverend Charles Goldsmith, at that time Curate of Forney, in the County of Longford, and Kingdom of Ireland. He was born on the 10th November, 1728, at a place called Pallas, in the parish of Forney. The income of his father was exceedingly limited, and, as he had seven children, he was reduced to considerable straights to maintain his family with any show of respectability. Henry, the eldest son, was destined for the church, and consequently a good education was to him indispensable. To obtain this, the other branches of the family were compelled to be comparatively neglected. It was proposed from his birth to bring up Oliver to some mercantile profession, which at that period was supposed to require little learning or accomplishments. Reading, writing and arithmetic were deemed as much as men of the ledger could digest with ease; and these were set down as the sum of knowledge the future painter of life and manners was to derive from his tutors. His first school was one kept by a dame at Lissoy; in the Parish of Kilkenny West, County Westmeath, to the rectory of which Charles Goldsmith was inducted in 1730. The characteristics of the child's mind appeared anything but promising. Mrs. Delap, his schoolmistress, admitted that he was one of the dullest boys ever placed under her charge, and doubted for some time whether anything could be made of him. In the words of a Mr. Handcock, who supplied Mr. Prior with some of his information, he seemed "impenetrably stupid!" or as Dr. Strean ascertained, "he was considered by his contemporaries and schoolfellows, as a heavy blockhead, little better than a fool, whom every body made fun of."

From the terrors and mortifications of Mrs. Delap's nursery for rising critics, young Goldsmith was removed to the domus of the village schoolmaster, Thomas Byrne—a man who had been a soldier in the wars of Queen Anne, and had seen some service in Spain. This old campaigner had more reverence for military orders of the day, than for the rules of syntax, and preferred recounting his strange adventures beyond the Pyrenees to solving the abstrusities of arithmetical compounds. He was, moreover, of a romantic turn, wrote poetry, and was well versed in the fairy lore of the country. His pupils, doubtless, had similar predilections; at all events, Master Oliver had; and to the marvellous relations which he was then accustomed to hear, his family afterwards attributed that wandering and unsettled disposition which was remarked in him through life. His eldest sister, Mrs. Hodson, has furnished an account of him at this period. "His temper, though peculiar, was kind and affectionate; his manner for the most part uncommonly serious and reserved; but, when in gay humour, none was more cheerful and agreeable. He was then, as he afterwards appeared to his acquaintances in London, solemn and yet gay, good-natured yet irritable, petulant sometimes, and instantly appeased by the smallest concession—so that such as did not understand or enquire into the occasional peculiarities of genius were puzzled by this contrariety of disposition; and the remark is preserved, that he seemed to possess two natures."

But though in all this there were some indications of the superficial man, there was little to reveal the spirit of genius which was struggling for birth within him. He plodded on with his "impenetrable stupidity," and picked up some knowledge of the horn-book, a facility at pot-hooks, and, it may be, a smattering of figures. He at the same time read and learned by rote many of the wild ballads common among the peasantry; and took great delight in listening to the fairy tales and superstitions with which every hill and valley—every stream and thicket, was rendered classical. But among his associates he was still made fun of, and misunderstood. It was while at the day-school at Lissoy, when Goldsmith was eight or nine years old, that he was attacked by the small-pox, the ravages of which left indelible traces upon a countenance which had always been uncommonly plain. On his recovery he was sent to a superior school kept by a clergyman, at Elphin, in Roscommon; in the neighbourhood of which lived one of his uncles, Mr. John Goldsmith, with whom he spent much of his time, and who was the first to notice the indications of talent which he exhibited.

His trials of temper and buffetings with the world had already commenced. He was scoffed and jeered by his schoolmates, as being ugly; and was nicknamed Æsop in derision. His sensitive nature felt these ribald taunts keenly: for his happiness always depended more upon the good opinion of others than upon himself; but the little of peevishness that was suffered to escape him, consisted of smart repartees, in which he sought to turn the jests discharged on him upon the head of his assailants. He did something better, however, in his leisure, than squabble with the idle and the brutal. He began to make verses, and to fancy that nature had designed him for a poet. It is not improbable that he and mankind owe the discovery and developement of his genius to his want of personal beauty;—to that which made it necessary for him to draw upon himself for his enjoyments;—to the creative power in his bosom, which loved to people its ideal world with happy human faces, in order to compensate for the repulses it was continually meeting with in actual life. He read much, grew intoxicated with literature, and became an incurable rhymer. Fortunately his uncle and mother were capable of seeing through his "impenetrable stupidity," and discerning the dawn of genius beyond. They had a good opinion of Oliver, encouraged his studies, and desired that he should have such an education given to him as might afford him a chance of making his way through life in a manner more congenial to him than at the desk of a merchant's counting-house. His father, with little demur, though it must have sorely tasked his means,—whose narrowness had, from youth upwards, kept him engaged in that perpetual struggle of the poor man, whose table is surrounded by "olive branches," to "make one guinea do the work of two,"—acquiesced with the general entreaty, and it was decided that Oliver, at a fitting age, should be sent to the University.

To prepare him for his altered destiny, he was removed first to a school at Athlone, and subsequently to one at Edgeworthstown in Longford—his relatives contributing a trifle each to ease the extra burden thus cast upon the poor old rector of Kilkenny. A singular anecdote is related of Oliver's last journey to Edgeworthstown, previously to his entrance at college. Having left home on horseback, he reached Ardagh, where it was necessary for him to sleep, at night-fall. He had a guinea in his pocket, and was determined to enjoy himself. He asked for the best house in the place, and from a piece of Irish literal comprehension, or waggery, was directed to a private house instead of an inn. Goldsmith had no thought of a mistake, and, being readily admitted by the servants, who, from his confidence concluded that he was some well known friend and invited guest of their master, he gave directions concerning his horse, and being shewn into the parlour, found there the owner of the mansion at his fire-side—a Mr. Featherstone, a gentleman of fortune, and somewhat of a wit. Goldsmith began to call about him with authority, as one entitled to attention; and, his host having soon detected the youth's error, and being willing to enjoy an evening's amusement, humoured his guest, caused wine, and whatever else Oliver chose to order to be brought him; accepted with his wife and daughters an invitation to supper at his own table, and received with becoming attention strict injunctions to have a hot cake ready for breakfast on the following morning. It was not till he called for his bill before quitting the house that the abashed school-lad discovered his blunder, and learned that he had been entertained at the residence of an old acquaintance of his father. The adventure was subsequently made to furnish the main incident in the comedy of 'She stoops to Conquer.'

Goldsmith was sent to Dublin and entered at Trinity college, the 11th of June, 1745, as a sizar. His brother Henry had been a pensioner, and it is said that the pride of Oliver revolted at the humbler condition into which the diminished means of his parents caused him to be thrust. In his own opinion his sizarship was the cause of many of his subsequent mortifications, in depriving him of that consideration among his companions on which so much value is set by youth. The duties and costume of the sizar certainly furnish a revolting picture of the humiliations to which the poor scholar was then subjected. He wore and still wears a black gown of coarse stuff without sleeves, and dines at the Fellows' table after they have withdrawn. In addition to this, at the period in question, he wore a red cap, and was compelled to perform menial offices, such as sweeping parts of the court in the morning, carrying the dishes from the kitchen to the dining table of the Fellows, and waiting behind their chairs till that body had dined. This treatment, added to that of his tutor, one Wilder, whose savage brutality and malice are said to have shone conspicuous, checked for a time every aspiring hope in the student and repressed the exertion of his talents. Of the fitness of this Wilder to direct the studies of such a pupil as Oliver Goldsmith, one anecdote is sufficient. A hackney coachman having accidentally touched his face with the whip while his vehicle was proceeding at a fast pace through the street, he sprung at a bound from the pavement to the box, and felled the driver to the ground. Disgust and hopelessness naturally produced irregularities, and these in turn led to scrapes. Between the author of 'The Deserted Village,' and his college life "there was no great love from the beginning, and it pleased heaven to decrease it upon further acquaintance."

In the midst of these distresses, Goldsmith's father died, and his remittances from home, which were sufficiently scanty before, now ceased altogether, and his prospects were proportionately darkened. An uncle occasionally supplied his most pressing necessities however, and with this resource, and another which he discovered about this time, added to his constitutional "knack at hoping;" he contrived to maintain himself in tolerably good spirits. His discovery was of a means of disposing of original street-ballads, for which he found a ready sale at a shop in Mountrath Street, at the price of five shillings each. This was the beginning of the career of Goldsmith as a professional *littérateur*.

In 1748, in consequence of the gross violence and insolence of the ruffian Wilder, his tutor, who inflicted personal chastisement upon him, he took a sudden resolution to forsake not only the scene of his mortification, but his country, and to seek his fortune in a kinder region. He accordingly disposed of his books and clothes, and quitted the University, but loitered in Dublin till he had but a shilling left, with which he set out for Cork. It was his intention to take ship thence for some other land, but his resources did not hold out long enough to carry him to the place of embarkation. On his single shilling he supported himself nevertheless for three days; and when that was gone, he parted by degrees with his clothes, till at length he was reduced to such extremity of famine that, after fasting for twenty-four hours, he thought a handful of grey peas, given him by a girl at a wake, the most refreshing meal he had ever made. Fatigue and destitution induced him to return, and his brother, to whom he communicated his situation, clothed and carried him back to his college, where a sort of reconciliation was brought about between Wilder and him. The latter continued as before to detest mathematics, and to perpetrate poetry;—the tutor resumed his tyranny with increased malignity and hatred.

But notwithstanding his poverty and misery, which would have hardened and corrupted the heart of many of less noble natures, Goldsmith had the most enlarged sympathy for the distresses of others. Mr. Edward Mills, a rich relative and fellow student of his, who occasionally furnished him with small supplies of money, and frequently invited him to partake his meals, used to relate a story characteristic at once of his improvidence and goodness of heart. "Being summoned on one occasion to breakfast, Oliver declared from within to the messenger his inability to rise, and that to enable him to do so they must come to his assistance, by forcing open the door. This was accordingly done by Mills; who found his cousin not *on* his bed, but literally *in* it, having ripped part of the ticking, and immersed himself in the feathers, a situation from which he found it difficult to extricate himself. By his own account, in explanation of this strange scene, after the merriment it occasioned had subsided, it appeared that, while strolling in the suburbs on the preceding evening, he had met a poor woman with five children, who told a pitiful story of her husband being in the hospital, and herself and offspring destitute of food, and of a place of shelter for the night; and that, being from the country, they knew no person to whom, under such circumstances, they could apply with hope of relief. The appeal to one of his sensitive disposition, was irresistible; but unfortunately he had no money. In this situation he brought her to the college gate, sent out his blankets to cover the wretched group, and part of his clothes to be sold for their present subsistence; and finding himself cold during the night, from want of the usual covering, he had hit upon the expedient just related for supplying the place of his blankets."

This anecdote tells the whole secret of the life of Goldsmith—of his pleasures and his anguish; of his want of worldly tact and prudence to preserve or value money as he undoubtedly ought to have done, at least as a means of independence, and of his exquisite sense of the sufferings, and his earnest desire to relieve the wants, of others, even before he had provided for his own. He was conscious, sometimes painfully so, of his own imprudence; but he could never repress the spirit which prompted his uncalculating generosity. The following is a lesson on the subject, sent in a letter to his brother Henry in 1759. "Frugality and even avarice in the lower orders of mankind are true ambition. These afford the only ladder for the poor to rise to preferment. Teach then, my dear Sir, to your son thrift and economy: let his poor wandering uncle's example be placed before his eyes." It might have been desired that Goldsmith had never been compelled to write thus; but if he had never felt both the want which led to the sentence, and the sympathy which set his lectures at defiance, he would assuredly never have been the exquisite writer of poetry and prose that he was.

Oliver quitted the university in the spring of 1749-50 immediately after taking his degree of Bachelor of Arts, and for about two years lived chiefly at home with his mother, visiting among his friends, assisting his brother Henry in the management of his school, and joining in the rustic sports of the neighbourhood. His friends wished him to be ordained, but he had no great liking for the clerical profession and for a long time declined. At last, however, he consented to apply to the Bishop of the Diocese, and was rejected—according to one account, as being too young; to another, from his having neglected the proper professional studies, and the Bishop having received an exaggerated statement of his irrregularities at College; and according to a third, in consequence of his thoughtlessness and reputed love of gay dress, and a prejudice arising in the mind of the Bishop from the appearance before him of the candidate in scarlet breeches. At all events the now obscure Dr. Synge had the honour of "crowing over" poor Oliver Goldsmith, and of adding a small taste of wormwood to his cup of gall. The mortification, however, was not of a kind to break the heart of him who sustained it. He returned home and consoled himself by writing verses, telling stories, and singing songs; by shooting, fishing, playing the flute, and throwing the sledge.

The improvident poet next became tutor in a private family, and was subsequently furnished with fifty pounds by an uncle, in order that he might proceed to London, and keep the usual terms of Irish students, preparatory to being called to the bar. Oliver's evil genius attended him on his journey. He was seduced into a gaming house in Dublin, and stripped of every penny of his money; but, being ashamed to communicate his loss to his friends, he remained till nearly starved in the metropolis, when he was forgiven and invited back into the country. Physic was next selected for him as a profession; and by the united contributions of his uncle, brother and married sister, Mrs. Hodson, he was enabled to go, in the autumn of 1752, to Edinburgh to fit himself for taking his degree. He had not grown more reflecting in consequence of his repeated experience. The first thing he did after procuring a lodging in the Scottish capital is of a piece with most of the incidents of his life. He sallied forth to view the city, was rambling about during the whole day, and never bethought himself till night overtook him, that he had neglected to enquire the name of his landlady, and even that of the street in which he was to live. He was fortunate enough, however, to meet the porter who had carried his luggage to his new abode in the morning, and was by him directed home.

The progress of our medical student at Edinburgh is believed not to have been very satisfactory. He remained about a year and a half—long enough to get into more than one unpleasant predicament for want of money—and then proceeded to Leyden, where he is said to have been less attentive to the acquisition of professional than miscellaneous knowledge, and where he was frequently known to be in his usual pecuniary distress. Occasionally he subsisted on loans of small sums of money from friends, sometimes he "taught English to the natives," and at others he had recourse to gaming in hopes of extricating himself from his difficulties by some lucky turn of fortune. But his irregularities seem to have always proceeded from his poverty, and never from depravity or wilfulness. It is necessary to bear this in mind, as he has been accused, by such people as could see nothing in his childhood but impenetrable stupidity, of wrong heartedness as well as want of thought.

After a year's residence at Leyden, Goldsmith set out on his travels over the continent. He had no resources, but he had an ardent thirst for information, an unconquerable spirit of hope and gaiety, some learning, and a little medical skill. He was moreover young, vigorous, and accustomed to privation and hardships. Like the Baron Louis de Holberg of whom he has spoken in one of his works, "His ambition was not to be restrained, nor his thirst of knowledge satisfied until he had seen the world. Without money, recommendations or friends, he undertook to set out upon his travels and make the tour of Europe on foot. A good voice and a trifling skill in music were the only finances he had to support an undertaking so extensive: so he travelled by day, and at night sang at the doors of peasants' houses, to get himself lodging." He commenced his rambles, according to Dr. Ellis, who was one of his occasional companions at Leyden, with scarcely any cash and but one clean shirt:—

> "Remote, unfriended, melancholy, slow."

There is little doubt that the wanderings of George Primrose, in the 'Vicar of Wakefield,' Chap. XX, are, in all the main points, a correct description of the travels of the Author, who has left few other records of this interesting period of his life. Even the fact of his having had a pupil part of the way, is believed to be accurately stated—the name of the *liberal* young gentleman, being said to be Smyth or Smyly.

After traversing Flanders, part of France and Germany, Switzerland, Italy and France again, he returned early in the year 1756 to England, and in future fixed his abode in London. His opening prospects were of the most discouraging kind. He had neither "introductions, acquaintances nor impudence," to help him forward in the populous wilderness, and he was often put to the utmost shifts, for a meal and a lodging. There was once a rumour, which is not improbable, that he tried the Stage in a country town, as a low comedian. It is at all events certain that, in after life, he once expressed a desire to play a low comedy character—that of *Scrub* in the 'Beaux Stratagem.' It has also been reported that he set up in a country town as an Apothecary, and failed; and that he afterwards returned to London and accepted the situation of usher to a School. That he occupied the latter situation is universally admitted, and that he hated it with as thorough a detestation as he was capable of indulging, has been recorded in various places by himself, and by divers of his friends and familiars. That his means of life at this period were uncertain, is placed beyond dispute by the concurrent testimony of all who afterwards enjoyed his confidence; and of the dreadful necessities to which he was then subjected, a story told by him at one of those brilliant parties to which the Poet was welcome when his fame was established, will afford a faint but sickening idea. It commenced "when I lived among the beggars of Axe Lane." Well may he, as he subsequently did, have claimed some merit for not having had recourse to "the friar's cord, or the suicide's halter."

He gradually picked up a few acquaintances and renewed some old friendships, and was enabled by them to establish himself as Physician in a humble way, at Bankside, Southwark, where his poorer neighbours found him useful, but fee-paying patients cautiously avoided his residence. He had ample leisure, however, to turn his attention to literature, which he had always liked much better than pills and potions; and this brought him acquainted with Richardson, the celebrated novelist and printer, who is believed to have employed him occasionally as corrector of the press, and who introduced him to Dr. Young. His personal appearance at this time has been noticed by one who had known him at Dublin, and who now met him in London. "He was dressed, according to the fashion of the day, in a suit of green and gold, but old and tarnished, and his shirt and neckcloth appeared to have been worn at least a fortnight. He said he was practising physic and doing very well." Sir Joshua Reynolds used afterwards to relate a story to the same effect, on the same subject, and relative to the same period. "In conformity to the prevailing garb of the day for physicians, Goldsmith, unable to obtain a new, had procured a second-hand velvet coat; but either from being deceived in the bargain, or by subsequent accident, a considerable breach in the left breast was obliged to be repaired by the introduction of a new piece. This had not been so neatly done as not to be apparent to the close observation of his acquaintance, and such persons as he visited in the capacity of medical attendant. Willing, therefore, to conceal what is considered too obvious a symptom of poverty, he was accustomed to place his hat over the patch, and retain it there carefully during the visit. But this constant position becoming noticed, and the cause being soon known, occasioned no little merriment at his expense."

While struggling for the precarious and humiliating existence which his Bankside business yielded, he fell in with an old fellow-student from Edinburgh, the son of Dr. John Milner, who kept a classical school at Peckham in Surrey. An offer was made to Goldsmith to take charge of this establishment during the illness of the elder Milner, and it was readily accepted, as offering at least a security from starvation, which seemed impending. "All the ambition" of Oliver, according to his own statement, "was now to live;" and here he could live in comparative comfort.

His character, as developed at Peckham, has been thus stated from recollection by Miss Milner, the sister of his friend:—"He was very good-natured, played tricks, somewhat familiar, and occasionally a little coarse, upon the servants and boys; told very entertaining stories, and found amusement in his flute. With the scholars he was a favourite, being ever ady to indulge them in certain school-boy dainties, whenever his pecuniary means permitted; and he was not over strict in discipline. His benevolent feelings appeared always active; mendicants rarely quitted him without relief, and a tale of distress roused all his sympathies. His small supplies were thus exhausted frequently before his stated salary became due, when Mrs. Milner would say to him with a smile, upon application for an advance—'You had better, Mr. Goldsmith, let me take care of your money, as I do for some of the young gentlemen;' to which he would reply in the same spirit of good humour, 'In truth, Madam, there is equal need.'"

It was at Peckham he first procured what may be termed regular literary employment. This was from Mr., afterwards Dr., Griffiths, a friend of the Milners', then a bookseller in Paternoster Row, and proprietor of the 'Monthly Review.' The terms on which he engaged with this literary vampire were his board and lodging in the house of his employer, and "an adequate salary." At the end of five months this strange contract was brought to a premature close. Goldsmith was tired of his drudgery, and Griffiths was dissatisfied with the labours of an author who regarded quality as more essential than quantity in his compositions. But this was not all. Both the bookseller and his wife interfered with the articles of the poor scribe, in a manner that made their production altogether irksome; and they had no regard to his domestic comfort or convenience. It was consequently a release from bitter thraldom, when Oliver found himself at liberty to write once more when and as he chose; although perhaps he was compelled, as a set off against this privilege, to put up with less and coarser food.

His connection with the Review did not close with his change of residence. He continued for many months, after ceasing to be a domestic in the establishment of Mr. and Mrs. Griffiths, to be one of their hacks, and wrote articles to order on Politics, Poetry, Medicine, Mathematics, History and Romance; filling his leisure by translating Memoirs and Novels from the French, and by preparing occasional contributions to the 'Literary' and the 'Grand Magazine.' He appears now to have worked almost incessantly, and if we may except the satisfaction he must have derived from the introduction his labours procured him to Dr. Johnson, Mr. (afterwards Bishop) Percy, Edmund Burke, and a few other distinguished men, his toil seems to have met with little reward. In a letter, written at this time [August, 1758] to a friend in Ireland, he gives a lively picture of his mind and his miseries. "I sat down," he says, "with an intention to chide, and yet methinks I have forgot my resentment already. The truth is, I am a simpleton with regard to you. I may attempt to bluster; but, like Anacreon, my heart is respondent only to softer affections. And yet, now I think on't again, I will be angry. God's curse, Sir! who am I? Eh! what am I? Do you know whom you have offended? A man whose character may one of these days be mentioned with profound respect in a German comment or Dutch dictionary; whose name you will probably hear ushered in by a Doctissimus Doctissimorum, or heel-pieced with a long Latin termination. Think how Goldsmithius, or Gubblegurchius, or some such sound, as rough as a nutmeg-grater, will become me? Think of that!—God's curse, Sir! who am I? I must own my ill-natured contemporaries have not hitherto paid me those honours I have had such just reason to expect. I have not yet seen my face reflected in all the lively display of red and white paint on any sign-posts in the suburbs. Your handkerchief-weavers seem as yet unacquainted with my merits or physiognomy, and the very snuff-box makers appear to have forgot their respect. Tell them all from me, they are a set of Gothic, barbarous, ignorant scoundrels. There will come a day, no doubt it will—I beg you may live a couple of hundred years longer only to see the day—when the Scaligers and Daciers will vindicate my character, give learned editions of my labours, and bless the times with copious comments on the text. You shall see how they will fish up the heavy scoundrels who disregard me now, or will then offer to cavil at my productions. How will they bewail the times that suffered so much genius to lie neglected! . . . . Let me stop my fancy to take a view of my future self; and, as the boys say, 'light down to see myself on horseback. Well, now I am down, where the d——l *is I?* Oh! Gods! Gods! here in a garret, writing for bread, and expecting to be dunned for a milk score!"

The melancholy conclusion of this was not overcharged. Goldsmith was then living in a miserable house in Green Arbour Court, between the Old Bailey and what is now Farringdon Street. Bishop Percy who visited him there has described his condition and abode. "He was employed in writing his 'Enquiry into the present state of Taste and Literature in Europe,' in a wretchedly dirty room, in which there was but one chair, and when, from civility this was offered to his visitant, he himself was obliged to sit in the window. While they were conversing some one gently rapped at the door, and on being desired to come in, a poor ragged little girl of very decent behaviour entered, who dropping a curtesy, said 'My mamma sends her compliments, and begs the favour of you to lend her a chamber-pot full of coals.'" Other accounts correspond with the Bishop's; yet neither poverty nor hopelessness could breed in him a feeling of misanthropy. His good-humour, his sociality, his benevolence were undiminished. He still petted the children of his humble neighbours, gave them cakes and sweetmeats, and coaxed them to dance to the music of his cheerful flute; and, little as he had to spare for the necessities of others, he contrived occasionally to alleviate the distresses of those who, in his eyes, had more wretchedness and less resources than himself.

The landlord of the house in which he lodged, having fallen into difficulties, was arrested. Goldsmith owed a small sum for rent, and being applied to by the wife of the prisoner to assist in releasing her husband, he at once sent a new suit of clothes to the pawnbroker, and applied the whole proceeds—more than sufficient to discharge his own debt—towards liquidating the demand of the bailiff. It is believed to have been on account of this identical suit of clothes, obtained on the security of the inexorable bookseller and reviewer, Griffiths, that the latter and Goldsmith quarrelled, and closed their connexion. Griffiths had become bound for him to the tailor, on condition that the clothes should be paid for by a certain date, or returned; and neither of the stipulations having been fulfilled, the hapless creditor was branded as dishonest, and threatened with the utmost severity of the law. The reply of the poor author to his heartless accuser exhibits the despair to which he was driven by the treatment he experienced. "I know of no misery," he says, "but a gaol, to which my own imprudencies and your letter seem to point. I have seen it inevitable these three or four weeks, and, by heavens! request it as a favour—as a favour that may prevent somewhat more fatal. I have been some years struggling with a wretched being—with all that contempt that indigence brings with it—with all those strong passions which make contempt insupportable. What then has a gaol that is formidable? I shall at least have the society of wretches, and such is, to me, true society. . . . . Had I been a sharper, had I been possessed of less good nature and native generosity, I might surely now have been in better circumstances." The debt, it scarcely need be added, was subsequently paid—dearly paid by literary labour: but there was no renewal of intercourse between Goldsmith and Griffiths. The two men, it is evident, could never have understood each other. Griffiths was a mere money-grubber, and the authors in whom he dealt were regarded by him but as butchers regard their calves—with a keen eye to what they would fetch, on the instant, across the counter.

Even this incident, deeply as it affected the poet at the moment, failed to sour his temper or disposition. He made a number of half-resolutions to be more prudent for the future; but, even while framing them, he knew that their observance was not in his nature. He thus alludes to the subject in a strain of delicate jest, wound up with the gentlest and most unaffected pathos, in a letter to his cousin Mrs. Lauder:—

"I have already given my landlady orders for an entire reform in the state of my finances. I declaim against hot suppers, drink less sugar in my tea, and check my grate with brick-bats. Instead of hanging my room with pictures, I intend to adorn it with maxims of frugality. Those will make pretty furniture enough, and won't be a bit too expensive; for I shall draw them all out with my own hands, and my landlady's daughter shall frame them with the parings of my black waistcoat. Each maxim is to be inscribed on a sheet of clean paper, and wrote with my best pen; of which the following will serve as a specimen:—'Look sharp;' 'Mind the main chance;' 'Money is money now;' 'If you have a thousand pounds, you can put your hands by your sides, and say you are worth a thousand pounds every day of the year;' 'Take a farthing from a hundred and it will be a hundred no longer.' Thus, which way soever I turn my eyes, they are sure to meet one of those friendly monitors; and as we are told of an actor who hung his room round with looking-glass to correct the defects of his person, my apartment shall be furnished in a peculiar manner, to correct the errors of my mind.

"Faith! Madam, I heartily wish to be rich, if it were only for this reason—to say, without a blush, how much I esteem you; but alas, I have many a fatigue to encounter before that happy time comes, when your poor old simple friend may again give a loose to the luxuriance of his nature, sitting by Kilmore fireside, recount the various adventures of a hard-fought life, laugh over the follies of the day, join his flute to your harpsicord, and forget that ever he starved in those streets where Butler and Otway starved before him."

The asperities of literary life, indeed, seem at last to have worn out his patience, and he made an effort to obtain a better provision for his wants. Through the uniform kindness of the Milner family he procured an appointment, in his medical capacity, under the East India Company; but on presenting himself at the College of Surgeons to pass the required examination to qualify him for his post, he was rejected. "Accident, or something akin to accident," says his biographer, Mr. Prior, "did for him what it has done for others of our eminent men, who had determined to proceed abroad in pursuit of wealth,—it kept him at home to acquire fame; and, as in the instances of Burke and Burns, to elevate the literature of our country." He was doomed, that is, to drudge through many tedious years, instructing and amusing mankind for barren applause, and to have his end hastened by mental anxieties occasioned by debts and duns. Fame, however it may sound, is one of the most illusory of all objects of pursuit. No man can be sure that it will be vouchsafed to him by posterity, which can alone award it; and present want sadly dims its lustre in the prospect. Goldsmith was sustained in his struggle after the phantom, by his genial love of humanity, his capacity to see a bright side in every thing, and to extract pleasure from the most unpromising materials. He had nothing morbid in his constitution; and, loving literature for its own sake, he was content to live and labour to prolong the pleasures of mere existence; while, for the rest, he was an inveterate hoper.

That sickness of heart and despondency occasionally preyed on his spirits may well be conceived; and that the privations to which he was subjected did their work on his frame is certain. In a letter to his brother Henry, written in February, 1759, the following passages occur: "It gives me some pain to think I am almost beginning the world at the age of thirty-one. Though I never had a day's sickness since I saw you, yet I am not that strong active man you once knew me. You scarcely can conceive how much eight years of disappointment, anguish, and study have worn me down. If I remember right, you are seven or eight years older than me, yet I dare venture to say that, if a stranger saw us both, he would pay me the honours of seniority. Imagine to yourself a pale, melancholy visage, with two great wrinkles between the eyebrows, with an eye disgustingly severe, and a big wig; and you may have a perfect picture of my present appearance. On the other hand, I conceive you as perfectly sleek and healthy, passing many a happy day among your own children, or those who knew you a child.

"Since I knew what it was to be a man, this is a pleasure I have not known. I have passed my days among a parcel of cool designing beings, and have contracted all their suspicious manner in my own behaviour. I should actually be as unfit for the society of my friends at home, as I detest that which I am obliged to partake of here. I can now neither partake of the pleasure of a revel, nor contribute to raise its jollity. I can neither laugh nor drink; have contracted a hesitating, disagreeable manner of speaking, and a visage that looks ill-nature itself. In short, I have thought myself into a settled melancholy, and an utter disgust of all that life brings with it."

Calmer and better days soon followed. He became known to the Dodsleys, to Mr. Hamilton, proprietor of the Critical Review, to Dr Smollett, and finally to Mr. Newbery, "the philanthropic bookseller of St. Paul's Churchyard, who has written so many little books for children, who found and relieved the 'Vicar of Wakefield,' at the roadside inn, and who, through life, was Goldsmith's best patron. While these friendships were ripening, however, he was at work extending his reputation and influence by writing 'The Bee,' a short series of periodical papers in the manner of the 'Spectator,' and contributing to 'The Busy Body,' and 'The Lady's Magazine.' It was the merit of 'The Bee' in all probability that led Newbery to seek his assistance in a new paper of his, 'The Public Ledger,' commenced in January, 1760. This was enriched with 'The Chinese Letters,' since so universally known under the title of the 'Citizen of the World,' which had sufficient popularity to be pirated during their progress through the press, and which, immediately on their completion were reprinted and took their stand among the English Classics.

These several works procured their author a somewhat better income than he had at any previous time enjoyed; and he accordingly removed from Green Arbour Court, to Wine-Office Court, Fleet Street, where he enlarged at once his establishment and his list of friends. He still worked hard, however, without growing rich, or even acquiring the means of comfort; and still, though known to be capable of the highest literary achievements, he was condemned to flounder on amid the lowest—now penning a newspaper criticism, a puff, or a preface, or tagging a new close to an old work. Among other things which he did at that time, was 'A pamphlet respecting the Cock Lane Ghost' for three guineas; a 'History of Mecklenburgh, from the first settling there of the Vandals;' an 'Abridgment of Plutarch's Lives,' for twelve, and a 'Life of Beau Nash,' for fourteen, guineas. The rate of remuneration which he was accustomed to receive is ascertainable from the last mentioned work, which consists of not less than 240, 8vo. pages, the composition of which employed him for five weeks. The whole produce of the year was about fourteen volumes—the pay less than one hundred and twenty pounds. Goldsmith has been accused of want of industry and want of economy. With these facts before him, the reader will require no formal refutation of such absurd and twaddling calumnies.

It will be rightly judged from this that the upward career of Oliver was scarcely less chequered than his outset in life. Although mixing with men of the highest mark, his means were still of the humblest; and poverty is sure to bring adventures,—grave or ludicrous as they may be but always disagreeable, and not unfrequently painful, to their hero.

In 1762, in consequence probably of his incessant labour, we find the health of Goldsmith so impaired that for several weeks he was compelled to keep his chamber, and to abstain, for a period, from writing; and at the end of that year he took lodgings at Islington, in order partly to be near the residence of Newbery, who lived at Canonbury House, and partly for the benefit of country air. It was here that he wrote, to say nothing of minor and forgotten things, thrust upon him by the hard necessities of the moment, one of his most popular works, 'The History of England in a series of Letters from a Nobleman to his Son,' which was attributed by some to the Earl of Chesterfield, by others to the Earl of Orrery, and finally they settled down in public estimation as being the property of Lord Lyttleton;—a name which they retain in booksellers' catalogues to the present day. There is reason to believe that the putative author was pleased to be deemed the writer of so elegant and useful a work; and Goldsmith, although known among his friends to have produced the book, took no pains to set the general reader right in a matter which might have given offence to one who, it is said, promised, but forgot, to patronize and befriend him. The success of the work exceeded all expectation. New editions were called for continually, and still the book is read with delight and instruction, and has been recommended by no less an authority than Sir Walter Scott, in one of his introductions to the 'Tales of a Grandfather,' as the best compendium of English History extant. Goldsmith, it is believed, received for the two volumes, of which the work consists, about £50!

It was at Islington also, according to contemporary accounts, that he wrote his 'Vicar of Wakefield,' the first work which he composed without its being previously ordered, or at least bargained for, by a publisher. There is a story connected with the completion and sale of this delightful book which must not be omitted. It was related by Dr. Johnson to Boswell, who has thus recorded it: "I received one morning," said Johnson "a message from poor Goldsmith that he was in great distress, and as it was not in his power to come to me, begging that I would come to him as soon as possible. I sent him a guinea, and promised to come to him directly. I accordingly went as soon as I was dressed, and found that his landlady had arrested him for his rent, at which he was in a violent passion. I perceived he had already changed my guinea, and had got a bottle of Madeira and a glass before him. I put the cork into the bottle, desired he would be calm, and began to talk to him of the means by which he might be extricated. He then told me he had a novel ready for the press, which he produced to me. I looked into it, and saw its merit; told the landlady I should soon return, and, having gone to a bookseller, sold it for sixty pounds. I brought Goldsmith the money, and he discharged his rent, not without rating his landlady in a high tone for having used him so ill." Cumberland has added to this anecdote a piece of Romance—related afterwards, perhaps as a jest, among the poet's friends, but certainly not founded on fact—that the landlady, while the bailiffs were waiting without, had proposed to her lodger the startling alternative of instant payment or marriage!

Francis Newbery—not the poet's friend—was the purchaser of 'The Vicar,' but although, on the recommendation of Johnson, he had consented to give a higher price than was usually paid for the works of the same author, he thought so indifferently of his bargain that he kept it by him unpublished for two years, till the success of the 'Traveller' had placed the name of the writer in the very highest rank of Literature.

The 'Traveller' was published in December, 1764, and was everywhere read and everywhere praised. Johnson spoke highly of it in public and private, and quoted it in his writings and in society. It was said to be "without one bad line—without one of Dryden's careless verses." Burke, Fox, Reynolds—all the Reviewers, and all men of taste and literature conspired to applaud it as "one of the finest poems in the English language." But Goldsmith was not to be permitted to step thus easily upon the pedestal of fame. Though nobody could dispute the merit of the poem, certain critics who, from his easy good-nature and simplicity, had long considered themselves entitled to laugh and sneer at "poor Goldy," now disputed the paternity of his work, and declared that the finest passages of 'The Traveller' had been written by Johnson;—an imputation which the Doctor's disavowal failed for some time to remove. Johnson is known to have revised the poem for press, and to have rewritten nine lines of it; but beyond this he had no share in its design or construction. In eight months 'The Traveller' went through four editions; and five more were subsequently published during the life of the author, who profited by its production and popularity to the extent of twenty-one pounds sterling!

The sensation produced by the poem, led to an invitation from the Earl of Northumberland, who seems to have been inclined to render him assistance. The account of his interview is thus related by Sir John Hawkins; who, having been with the Earl on business, waited to accompany his friend home: "Upon his coming out," says Sir John, "I asked him the result of his conversation. 'His Lordship,' says he, 'told me he had read my poem, and was much delighted with it; that he was going out as Lord Lieutenant of Ireland, and that hearing I was a native of that country he should be glad to do me any kindness.' 'And what did you answer,' asked I, 'to this gracious offer?' 'Why,' said he, 'I could say nothing, but that I had a brother there, a clergyman, who stood in need of help. As for myself, I have no dependance on the promises of great men; I look to the booksellers for support; they are my best friends, and I am not inclined to forsake them for others.' Thus," adds the brutal knight, "did this idiot in the affairs of the world trifle with his fortunes, and put back the hand that was held out to assist him!" Goldsmith having been, on an after occasion, subjected to a similar charge of idiocy in the affairs of the world, was so absurd as to say, "I can earn as much as will supply my wants, without writing for party; assistance therefore is unnecessary to me." This was the secret of his indifference to the offer of the Lord Lieutenant. One Robert Burns, whom Sir John Hawkins would also have treated as an idiot, has left on record a sentiment similar to that of Goldsmith:—"I was bred to the plough, and am independant." These men—to whom must be added one Andrew Marvel—were content with an honestly-earned, though homely, subsistence, and left to the seekers after wealth, and ribbons, and titles, like Sir John Hawkins, the office of pander to the fortuitously great.

Goldsmith continued to write for bread, and preserved his integrity. But, though he did not care to avail himself of his reputation to acquire political patronage, he enjoyed considerable advantage from it in the increased estimation in which he was held among booksellers. In June, 1765, his admirable 'Essays' were published. In March, 1766, appeared the 'Vicar'—the interval between the publication of these being filled with anonymous articles for Magazines and Reviews; with translations from the French, and Historical, and Scientific compilations. The revenue brought him by these labours, enabled him to take and furnish chambers in the Temple, first at No. 2, Garden Court, and subsequently at No. 2, Brick Court, which last he continued to occupy till his death.

In the beginning of 1767 he completed his first Comedy 'The Good-Natured Man,' which, after being shelfed for some months by Garrick, was brought upon the stage in January, 1768, at Covent Garden, and was eminently successful, being played twelve nights during the season—ten of the performances succeeding each other nightly. The profits are believed to have been from £350 to £400, besides what he derived from sale of the copyright, which, from the fact that four editions were sold off within a month, is likely to have been considerable.

His habits at this period appear to have been unchanged. He lodged during a part of the summer of 1767 in the old turret of Canonbury House, where he had several authors of different degrees of eminence as fellow-residents, who were accustomed to spend their evenings together at the Crown Tavern, in the Lower-road, Islington. A 'shoemaker's holiday,' as he termed it, was a favourite recreation. Lee Lewes, in his Memoirs, has described one of these festive days. He had called upon the poet one morning and found him working at the 'Deserted Village,' After reading what he had written, Goldsmith observed:—"Come, let me tell you this is no bad morning's work; and now, my dear boy, if you are not better engaged, I should be glad to enjoy a shoemaker's holiday with you." The day was commonly spent thus:—

"Four or five friends assembled at his apartments to a remarkably plentiful and rather expensive breakfast; and when finished, he had usually some poor women in attendance, to whom the fragments were consigned. On one occasion a wealthy city acquaintance, not remarkable for elegance of mind or manners, who observed this liberality, said with some degree of freedom, 'Why Doctor, you must be a rich man; *I* cannot afford to do this.' 'It is not wealth, my dear Sir,' was the reply of the Doctor, willing to rebuke, without offending his guest, 'but inclination. I have only to suppose that a few more friends than usual have been of our party, and then it amounts to the same thing.'" About eleven o'clock the party proceeded to Blackheath, Highgate, Hampstead, Wandsworth, or some other suburban village or hamlet to dine, returned to some place of popular resort nearer town, such as the White Conduit Gardens, to tea, and concluded by spending the evening at the Grecian, Temple, or Exchange Coffee House, at the Globe, Fleet Street, or the Crown, Islington.

In February, 1769, Goldsmith commenced his 'History of Animated Nature,' one of the most profitable of his literary undertakings. In May, of the same year, his 'Roman History' was published, and in June he entered into an engagement to write a 'History of England.' In December he was elected Professor of Ancient History to the newly established Royal Academy of Arts—a situation to which no salary was annexed, and which he accepted, he says, "rather as a compliment to the Institution, than any benefit to himself:—Honours to one, in his situation, being something like ruffles to one that wants a shirt." In May, 1770, appeared 'The Deserted Village,' of which five editions were sold in less than three months; in June, was published his 'Life of Parnell,' prefixed to an edition of that poet's works; and in December his 'Life of Bolingbroke' appeared. His comedy, 'She Stoops to Conquer,' although completed some time before, was not played till the 15th of March, 1773, when, contrary to the expectation of all his friends, it was received with the most unqualified approbation, and six thousand copies of it were speedily sold, when published. In June, 1773, his 'History of Greece' was published. This, with the exception of a few minor pieces of prose and verse, some new editions of his former works, and the publication of the 'History of the Earth and Animated Nature,' was the poet's last labour. Pecuniary embarrassments, over exertion, and mental disquietude, from various causes, had affected his health; and he gradually sank into despondency. Fever ensued, and on the morning of the 4th of April, 1774, he expired at his chambers in the Temple, at the age of forty-five.

The last years of Goldsmith's life had been passed in comparative comfort, among friends who esteemed and could appreciate him. He occasionally made excursions into the country—to Derbyshire, Hampshire, Sussex, Suffolk, Yorkshire, Leicester and Lincoln; and once he proceeded with some friends, for a few weeks, as far as Paris. One of his favourite places of retirement was a farm-house, near the village of Hyde, on the Edgeware-road, about six miles from London. His mode of life in this pleasant seclusion has been related by the son of the occupier at the time Oliver was a frequent inmate. "The poet boarded with the family, but usually had his meals sent to his own apartment, where his time was chiefly spent in writing. Occasionally he wandered into the kitchen, took his stand with his back towards the fire, apparently absorbed in thought, till something seeming to occur to his mind, he would hurry off to commit it, as was supposed, to paper. Sometimes he strolled about the fields, or was seen loitering or musing under the hedges, or perusing a book. Frequently he visited town and remained absent many weeks at a time, or paid visits to private friends in other parts of the country.

"In the house he usually wore his shirt collar open, in the manner represented in the portrait by Sir Joshua Reynolds. Occasionally he read much at night when in bed; at other times, when not disposed to read, and yet unable to sleep, which was not an unusual occurrence, the candle was kept burning; his mode of extinguishing which when out of his reach was characteristic of his fits of indolence or carelessness—he flung his slipper at it, which in the morning was in consequence usually found near the overturned candlestick daubed with grease. No application of a charitable description was made to him in vain. Itinerant mendicants he always viewed with compassion, and never failed to give them relief; while his actions generally evinced much goodness of heart and great commiseration for the poorest classes of society. . . . On one occasion he took the young people of the house to Hendon in a carriage, to see a company of strolling players; and proved not only very jocular on the road, but in his comments on the performance, which afforded all the party, and more particularly himself, by the laughter in which he indulged infinite amusement."

Of the pleasure which he derived from the society of children—no bad test of the disposition of the man—many anecdotes are related. In all the diversions of such companions he took such interest as to become rather a leader than a mere participator. He joined readily and heartily in blind-man's buff, romping, forfeits, or trivial games at cards, in which by affecting to cheat, or shewing an eagerness to win, he rendered his playmates exceedingly boisterous and mirthful. George Colman, the Dramatist, has related a pleasant story of his introduction, when a child, to our author. Goldsmith took the boy on his knee and began playing with him; but his familiarity was recompensed with a smart slap on the face from the urchin caressed. The elder Colman inflicted summary justice on his peevish son for the outrage, by locking him up in the dark in an adjoining room. George howled and screamed at the top of his lungs, till at length a friend appeared to liberate him—the tender-hearted Doctor, whom he had so wantonly molested—with a smile on his countenance, still red from the violence of assault. "I sulked and sobbed," says the narrator, "and he fondled and soothed, till I began to brighten; when seizing the propitious moment of returning good-humour, he put down the candle and began to conjure. He placed three hats, which happened to be in the room, upon the carpet, and a shilling under each. The shillings he told me were England, France, and Spain. 'Hey, presto, cockolorum!' cried the Doctor, and lo! on uncovering the shillings which had been dispersed, each beneath a seperate hat, they were all found congregated under one. I was no politician at the time, and therefore might not have wondered at the sudden revolution which brought England, France, and Spain all under one crown; but as I was also no conjurer, it amazed me beyond measure." Thenceforward Goldsmith and young Colman were always cordial friends and merry playfellows. Northcote, the Biographer of Reynolds, has expressed himself to the same effect. "When Goldsmith entered a room, Sir," said he, "people who did not know him became for a moment silent from awe of his literary reputation; when he came out again, they were riding upon his back."

The venerable Irish Judge Day, who, in 1831, retained a distinct recollection of his illustrious countryman, thus describes his person and manners:—"He was short, about five feet five or six inches; strong but not heavy in make; rather fair in complexion, with brown hair, such at least as could be distinguished from his wig. His features were plain but not repulsive, certainly not so when lighted up by conversation. His manners were simple, natural, and perhaps on the whole, we may not say polished—at least without that refinement and good-breeding which the exquisite polish of his compositions would lead us to expect. He was always cheerful and animated, often indeed boisterous in his mirth; entered with spirit into convivial society; contributed largely to its enjoyments by solid information, and the *naïveté* and originality of his character; talked often without premeditation, and laughed loudly without restraint. . . . He was fond of exhibiting his muscular little person in the gayest apparel of the day, to which was added a bag wig and a sword."

Testimonials as to the moral worth of Goldsmith, both as a man of literature and of the world, are abundant. Johnson wept over him; Burke burst into tears on hearing of his death, and Sir Joshua Reynolds abstained, for a space, from the use of his brush. The following summary of his character is said to have proceeded from the pen of Burke:—

"In an age when genius and learning are too generally sacrificed to the purposes of ambition and avarice, it is the consolation of virtue as well as of its friends, that they can commemorate the name of Goldsmith as a shining example to the contrary.

"Early compelled, like some of our greatest men, into the service of the muses, he never once permitted his necessities to have the least improper influence on his conduct; but, knowing and respecting the honourable line of his profession, he made no farther use of fiction than to set off the dignity of truth; and in this he succeeded so happily that his writings stamp no less the man of genius than the universal friend of mankind. Such is the outline of his poetical character, which perhaps will be remembered whilst the first-rate poets of the country have any monument left them. But alas! his noble and immortal part—the good man—is only consigned to the short-lived memory of those who are left to lament his death.

"Having naturally a powerful bias on his mind to the cause of virtue, he was cheerful and indefatigable in the pursuit of it; warm in his friendships, gentle in his manners, and in every act of charity and benevolence 'the very milk of human kindness.' Nay, even his foibles and little weaknesses of temper may be said rather to shew the simplicity of his nature than to degrade his understanding; for, though there may be many instances to prove that he was no man of the world, most of these instances would attest the unadulterated purity of his heart."

After the instances of his benevolence, which have been cited concerning his early life, little need be said of his later acts of kindness. Davies, one of his publishers, and the Biographer of Garrick, says, "His disposition of mind was tender and compassionate. No unhappy person ever sued to him for relief without obtaining it if he had anything to give; and rather than not relieve the distressed he would borrow. The poor woman with whom he had lodged during his obscurity several years in Green Arbour Court, by his death lost an excellent friend; for the Doctor often supplied her with food from his table, and visited her frequently with the sole purpose of being kind to her. . . . . He was so sincere a man that he could not conceal what was uppermost in his mind. So far from desiring to appear in the eye of the world to the best advantage, he took more pains to appear worse than he was, than others do to appear better than they are." His invariable kindness and good-nature caused him to be frequently duped by sharpers, and victimised by the indolent and unworthy; but even the detection of such frauds upon him did not check the stream of charity which was always welling from his heart. He had no gloomy suspicions of the rascality of mankind to close the portal of his affections—no remembered impositions of his own to narrow his soul. Guileless himself, he believed all men to be full of natural goodness; and when he found evil in their deeds, he was willing to ascribe it to perverse circumstances, rather than an inherent propensity to vice, and to trust them again, in the hope of their repentance and amendment.

Of his eccentricities many anecdotes have been preserved by his contemporaries. Some of them, however, evidently sprung from his sensitiveness—his horror of being thought harsh to others, of witnessing distress, or being made in his own person the subject of ridicule. Others proceeded from his poverty. He could not always in purse or appearance keep pace with his wealthier associates, and, unwilling to have his true circumstances known, he sometimes affected singularity to escape the imputation of being needy. Besides, he was a bachelor, and had mixed with all kinds of society, at home and abroad, to such an extent that he must, in a great measure, have despised the genteel conventionalities of those who expected to find in him a pattern of silver-fork elegance.

One anecdote of a species of eccentricity in which he is likely to find few imitators, is worth remembering. "He had more than once offered the use of his purse to a friend named Cooke (a young barrister of the Temple), which was at last accepted—the temptation of an evening at Marylebone, or Ranelagh Gardens, with several companions, being irresistible; although at the moment destitute of funds for the occasion. On applying to the Poet, however, he was told very seriously, and no doubt truly, that he had not a guinea in his possession. This being considered an evasion, something like a reproach escaped the applicant, that he regretted having made such a request, where, notwithstanding voluntary offers of assistance, there existed so little disposition to afford it. Nettled by the remark, Goldsmith, as evidence of his desire to oblige, borrowed the money. In the mean time Cooke, provided from another quarter, had locked his chambers, and proceeded to his amusement; but returning at an early hour in the morning, found a difficulty in opening the door, which on examination proved to arise from the sum he had requested, in silver, being wrapped in paper and thrust underneath. On being thanked for this proof of sincerity on the following day, but told that the money might as readily have fallen into strange hands as of him for whom it was meant, he characteristically replied, 'In truth, my dear fellow, I did not think of that.'"

Boswell, the Biographer of Johnson, and some others, have charged him with envy. Mr. Prior has very judiciously disposed of this accusation. Instead of envy, the rivalry which he exhibited should have been called emulation. "He was willing to believe he could do whatever he saw done by another. On his first entering into literary life, he found the attention of the reading part of the people fixed upon the Essays of Johnson, and thence he became an Essayist. The novels of Smollet were universally read, and he aimed to be a Novelist. Gray, Mason, Armstrong, Akenside and others claimed the honours of poetry, and he aspired to be a Poet. Hume, Smollet, and Robertson, having acquired high reputation in history, he desired to be a Historian; and dramatic writers were so numerous and many so fortunate, that, believing his own powers not inferior to theirs, he became a successful Dramatist. To call honest ambition of this kind envy, is an obvious misapplication of language."

As a poet all that he has written has been pronounced good by Lord Byron, while in the passage which contains this judgment, his Lordship says that not one half is good of the Æneid, of Milton or of Dryden.

Campbell, the author of the 'Pleasures of Hope' says that "Goldsmith's poetry presents a distinct and unbroken view of poetical delightfulness. His descriptions and sentiments have the purest zest of nature. He is refined without false delicacy, and correct without insipidity. . . . He unbends from graver strains of reflection to tenderness, and even to playfulness, with an ease and grace almost exclusively his own; and connects extensive views of the happiness and interests of society with pictures of life that touch the heart by their familiarity."

As a writer of prose, Dr. Anderson in his 'British Poets' says "Goldsmith must be allowed to have rivalled and even exceeded Dr. Johnson and his imitator Dr. Hawksworth, the most celebrated professional prose writer of his time. His prose may be regarded as the model of perfection, and the standard of our language; to equal which the efforts of most will be vain, and, to exceed it, every expectation folly."

Johnson, according to Boswell, said of his friend, "Whether we take him as a poet, as a comic writer, or as a Historian, he stands in the first class. He has the art of saying everything he has to say in a pleasing manner." In his works the Doctor has pronounced him to be, "A man of such variety of powers, and such felicity of performance that he always seemed to do best that which he was doing; a man who had the art of being minute without tediousness, and general without confusion; whose language was copious without exhuberance, exact without constraint, and easy without weakness."—"He was," said Johnson emphatically, on another occasion, "a very great man. Every year he lived he would have deserved Westminster Abbey the more!"

Sir Walter Scott has added his tribute to the throng. "The wreath of Goldsmith," he says, "is unsullied. He wrote to exalt virtue and expose vice; and he accomplished his task in a manner which raises him to the highest rank among British authors. We close his volume [The Vicar of Wakefield] with a sigh that such an author should have written so little from the stores of his own genius, and that he should have been so prematurely removed from the sphere of literature which he so highly adorned."

To these ample praises it is unnecessary to make any addition. It may however be interesting to the reader to be informed that, both in his poetry and prose, Goldsmith usually drew from nature, not only in the common acceptation of the phrase, but literally and in fact. 'The Traveller' in his poem of that name was himself, and the sentiments and feelings contained in the work are undoubtedly his own, founded on personal observation, during his peregrinations on the Continent. In his 'Deserted Village'—Lissoy is the village of Auburn.

"The sheltered cot, the cultivated farm,
The never-failing brook, the busy mill,
The decent church that topped the neighbouring hill,
The hawthorn bush, with seats beneath the shade,
For talking age and whispering lovers made!"

This is a true picture of the actual scene. And not less true is that of the village preacher, "passing rich with forty pounds a year," his modest mansion and its hospitality. The depopulation of Auburn also appears not to have been an imaginary circumstance. General Naper, it is said, on his return with a great fortune from Spain, purchased a large estate at Lissoy, and, in order to create an extensive park, ejected most of the inhabitants of the village, and pulled down their cottages.

In like manner he drew upon his recollection for the Primrose family in the 'Vicar of Wakefield.' The pastor was his father. His own adventures are related in those of George Primrose; the private marriages of two of his own sisters, which gave some uneasiness to their parents, are supposed to have supplied the incident of Olivia's elopement, and the name of Burchell was that of one of his connexions by marriage. The adventure which gave rise to 'She stoops to Conquer' has been already related.

Goldsmith was buried in the Temple burial ground on the evening of Saturday the 9th of April. It had been proposed to give him a public funeral in Westminster Abbey; but when it was ascertained that he had died considerably in debt, this design was abandoned, and a subscription entered into among his friends to erect there a monument to his memory. This was fulfilled. Nollekins executed a medallion likeness of the poet, and Johnson added a latin epitaph, from which the following is translated:—"OLIVER GOLDSMITH, Poet, Natural Philosopher, Historian, who left no species of writing untouched, or unadorned by his pen; whether to move laughter or draw tears, he was a powerful yet gentle master over the affections: of a genius sublime, lively and versatile; in expression noble, pure and elegant. His memory will last while Society retains affection, Friendship is not void of truth, and Reading is held in esteem."

A word only need be added. Goldsmith throughout his life worked and studied hard; and owed to his perseverance and the artistical skill which he acquired thereby, not less than to his genius, the graces of his inimitable style, and hence no small share of his reputation. His personal peculiarities, how characteristic soever of the man, had no part in raising him to the eminence he attained; but his moral rectitude, purity of heart, and superiority to those meannesses which, in the estimation of many, would have seemed venial in his circumstances, added to a courage and endurance which enabled him to overlook and surmount the most formidable obstacles, rendered him great, in spite of his peculiarities. This view—especially in perusing the biography of a favourite poet, who has passed on to Fame through the ordeal of poverty—is apt to be overlooked by young readers and young writers; and some mischief has resulted to both classes in consequence. To omit all consideration of so essential a circumstance here, would be absolute injustice to the name and unquestionable merits of

Oliver Goldsmith

OOTTERPARAH PUBLIC LIBRARY 1859

GOLDSMITH'S NATURAL HISTORY.

CHAP. I.

When we survey the vast scheme of Creation, and direct our attention more particularly to the wonders of the Animal Kingdom, the immense variety which is diffused around renders it a point of extreme difficulty where we shall begin to date our inquiries from. The number of beings endued with life, as well as we, seems, at first view, infinite. Not only the forest, the waters, the air, teems with animals of various kinds, but almost every vegetable, every leaf, has millions of minute inhabitants, each of which fill up the circle of its allotted life, and some are found objects of the greatest curiosity. In this seeming exuberance of animals, it is natural for ignorance to lie down in hopeless uncertainty, and to declare what requires labour to particularize to be utterly inscrutable. It is otherwise, however, with the active and searching mind; no way intimidated with the immense variety, it begins the task of numbering, grouping, and classing all the various kinds that fall within its notice; finds every day new relations between the several parts of the creation, acquires the art of considering several at a time under one point of view; and, at last, begins to find that the variety is neither so great nor so inscrutable as was at first imagined. As in a clear night, the number of the stars seems infinite; yet, if we sedulously attend to each in its place, and regularly class them, they will soon be found to diminish, and come within a very scanty computation.

Method is one of the principal helps in Natural History, and without it very little progress can be made in this science. All naturalists, therefore, have been very careful in adopting some method of classing, or grouping, the several parts of nature; and some have written books of natural history with no other view. These methodical divisions some have treated with contempt,* not considering that books in general are written with opposite views—some to be read, and some only to be occasionally consulted. The methodists in natural history seem to be content with the latter advantage, and have sacrificed to order alone all the delights of the subject, all the arts of heightening, awakening, or continuing curiosity.

Another fault in almost all these systematic writers is, that seeing the necessity of methodical distribution in some parts of nature, they have introduced it into all.† Finding the utility of arranging plants, birds, or insects, they have arranged quadrupeds also with the same assiduity; and although the number of these is so few as not to exceed two hundred,[*] they have darkened the subject with distinctions and divisions, which only serve to puzzle and perplex.

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* Buffon, in his Introduction, &c.

† Natural Systems in Zoology.—We hear even now of nothing but natural systems in every department of natural history. Classes and orders are, in some measure, constructed according to the principles professed by these improvers of science; but the genera are invariably as artificial as they could well be made, and the species are characterized precisely in the old way. It is utterly absurd to construct generic frames with the idea of circumscribing by them a certain number within the species; for no two species have the same organ precisely of the same form. For example, let the beak of a golden eagle be accurately described, and it will be found to correspond with no other beak in existence. For this very reason, one writer considers all the eagles and hawks as forming one genus; while another says they form twenty genera, and therefore an order. Linnæus's ideas were clear: his arrangements were professedly artificial; their object was to assist the memory; they were to be used until we should discover the hidden key by which we should be enabled to unlock the adamantine chest in which the secrets of nature are concealed from us. The ideas of modern naturalists are turbid; they neither give an idea of nature, nor classify natural objects artificially. The Linnæan method of arrangement ought to have been protected, instead

Instead, therefore, of taxing the memory and teasing the patience with such a variety of divisions and subdivisions, I will take leave to class the productions of nature in the most obvious, though not in the most accurate, manner. In natural history, of all other sciences, there is the least danger of obscurity. In morals, or in metaphysics, every definition must be precise, because those sciences are built upon definitions; but it is otherwise in those subjects where the exhibition of the object itself is always capable of correcting the error. Thus it may often happen, that in a lax system of natural history, a creature may be ranked among quadrupeds that belongs more properly to the fish or the insect classes. But that can produce very little confusion; and every reader can thus make a system the most agreeable to his own imagination. It will be of no manner of consequence whether we call a bird or an insect a quadruped, if we are careful in marking all its distinctions: the uncertainty in reasoning, or thinking, that these approximations of the different kinds of animals produce, is but very small, and happens but very rarely, whereas the labour that naturalists have been at to keep the kinds asunder, has been excessive. This, in general, has given birth to that variety of systems which we have just mentioned, each of which seems to be almost as good as the preceding.[†]

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of being rejected; and naturalists ought at the same time to have laboured in acquiring materials from which to construct a natural system. "The natural method," said Linnæus, "is the object at which all naturalists ought to aim."—Ed.

[*] In Dr. Shaw's General Zoology, the number of quadrupeds, not including the cetaceous and seal tribes, amount to five hundred and twelve, besides their varieties.

[†] MAMMALIA.—In Wilbrand and Ritsen's *Picture of Organized Nature*, we have an attempt at distribution of organic beings, according to the laws of latitude; and their distribution, according to the law of elevation jointly with latitude. As the equator appears to be the centre of organic vigour, from which the vivifying principle of heat extends to all parts of the organic world, the natural orders of plants and animals are accordingly marked and classed. The greatest luxuriance of organic life appears to be in the plains of the torrid zone, at the level of the sea. Animals differ from plants, in not adhering, or being bound to the soil. They change the country they inhabit in an arbitrary manner, and the more so as they approach man in perfection. Man extends through all the zones, passes beyond the limits of eternal snow, and descends into the earth, below the limits of terrestrial life.—Next to man, in partaking of life, are the mammalia, birds, amphibia, fishes, mollusca, insects, worms, and zoophytes. A certain portion of the earth is appointed to each class, order, or genus, and particularly to each species of animal. In such situations only does each species display its particular properties. A sufficient knowledge of an animal's condition cannot be learned, unless that animal be considered relatively to its own peculiar and natural situation. The Polar-bear lives only on and between the frozen plains of the North Pole; the lion, only in Africa's burning deserts. The inhabitants of the snow-line of the mountains between the tropics never descend to the warm level, nor do those of the level ascend the mountains as far as the snow-line—each altitude having its peculiar animals. The mammalia remain always in their native country; but birds are subjected to the change of seasons. The marine mammalia are met with in all the seas of the world, but principally in the Polar. Quadruped land mammalia extend from the snow-line to the torrid zone. Apes and monkeys belong to the torrid zone, but extend over a small part of the temperate zone. The whale belongs chiefly to the frozen sea; the spermaceti-whale chiefly inhabits the seas of the southern hemisphere. The dolphin is found in all seas, but chiefly in the north. The walrus and the seal, in the frozen seas of both hemispheres. Ruminating mammalia are common to those parts of the earth of which the grasses are native. The hart family extends from the snow-line to the torrid zone—the reindeer and the elk being the most northern species, and the Mexican roe and hart of the Andes the most southern. The camels of the old world belong to the warmer half of the temperate zone; those of the new world, including the llamas, to the grassy plains of the Andes. The ox tribe abounds in the middle of the temperate zones of both hemispheres, but they are domesticated as far north as 60°; and buffaloes are found in the torrid zone. Sheep and goats extend from the snow-line to the torrid zone, but extend in the greatest perfection over the colder half of the temperate zone. The horse is common

Taking, therefore, this latitude, and using method only where it contributes to conciseness or perspicuity, we shall divide animated nature into four classes: namely—Quadrupeds, Birds, Fishes, and Insects. All these seem in genera. pretty well distinguished from each other by nature; yet there are severa. instances in which we can scarce tell whether it is a bird or a quadruped that we are about to examine—whether it is a fish or an insect that offers to our curiosity. Nature is varied by imperceptible gradations: so that no line can be drawn between any two classes of its productions, and no definition made to comprehend them all. However, the distinctions between these classes are sufficiently marked; and their encroachments upon each other are so rare, that it will be sufficient particularly to apprize the reader when they happen to be blended *.

All quadrupeds, the number of which, according to Buffon, amounts to but two hundred, may be classed in the following manner:†—

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to temperate and warm climates, and is found wild in Arabia and Java. The limit to the spreading of the horse by domestication is 66° north latitude. Carniverous animals extend over all the zones, but are most numerous and terrific under the scorching sunbeams of the torrid zone. The dog extends from the limit of perpetual snow to the torrid zone in both hemispheres, terminating with the jackal and hyæna. The bear belongs to the coldest half of the temperate zone, but some species are found in the Andes. The cat genus is fiercest and most numerous in the hottest countries of the globe; towards the middle of the temperate zone, it diminishes into the wild cat. In Kamschatka, Greenland, Lapland, and Iceland, there are no cats; nor does the lynx in Europe extend further than Norway. The civets and weasel belong to the torrid and the warmer half of the temperate zone; sables, martens, ermines, stoats, and the common weasel, spread northwards in great numbers; but as they prefer woody tracks, they are seldom found beyond 70° north latitude. Moles, shrews, and hedgehogs inhabit both the temperate and torrid zones. The common mole lives throughout Europe, in Barbary, and in Northern Asia. The common hedgehog lives in the warmer parts of Europe: it is found in Norway, but not in Iceland or Lapland. Opossums inhabit the warm countries of America and New Holland. Bats extend over the whole earth. Dormice are most numerous in the torrid zone, but are also frequent in the temperate. The families of mice, squirrels, and hares are found in every part of the habitable globe. Beavers belong to the coldest half of the temperate zone; cavies to the warmer parts of the new world; porcupines to the warmest parts of the temperate zones of both hemispheres. The swine genus is much diffused: it belongs to the warmer parts of the temperate zones.

* Systems in Natural History.—The artificial and natural systems aim at two very distinct objects, which are in some measure incompatible with each other—the one being intended to make us acquainted with individuals; and the other, founded on an acquaintance with individuals, to combine them according to their characters, so as to abridge the labour of reasoning, and to enable us to ascend from particular to general truths.—Division and separation is the end of the artificial system; to establish agreements is the end of the natural. In one case we reason *a priori*, in the other, *a posteriori*. The prevalent error of the day, is the attempt to generalize where we ought to analyze. It is ridiculous, in the present state of our knowledge, to assign to each individual a certain place in nature; for, though some groups are so evidently marked, that the individuals composing them are united by the operation of the mind at the first glance, yet a mass will always remain which cannot be referred to families strikingly distinguishable.—Ed.

† Mammalia.—The class of mammiferous animals is placed at the head of the animal kingdom—not only because it is the class to which Man belongs, but because it is that which possesses the most numerous faculties, the most delicate sensations, and the greatest variety of action, and in which the assemblage of all their qualities appear so combined, as to produce an intelligence more perfect, more fertile in resources, less the slave of instinct, and more capable of progressive perfection, than what is found in any other classes. The class is called by Cuvier, Mammiferous; by Linnæus, Mammalia, from the Latin word *mammæ*, breasts or teats, by which the animals composing it suckle their young. In all mammiferous animals, the generation is essentially viviparous; and, as just now stated, they nourish their young with their milk. There has, however, been one singular animal discovered in New Holland, which possesses most of the characteristics of mammiferous animals; but naturalists are not decided whether it be viviparous or oviparous. This animal is called by Blumenback the *Ornithorhycus paradoxicus*. Should it prove to be ovip-

First, those of the Horse kind. This class contains the Horse, the Ass, and the Zebra. Of these, none have horns; and their hoof is of one solid piece.

The second class are those of the Cow kind; comprehending the Urus, the Buffalo, the Bison, and the Bonassus. These have cloven hoofs, and chew the cud.

The third class is that of the Sheep kind; with cloven hoofs, and chewing the cud, like the former. In this is comprehended the Sheep, the Goat, the Llama, the Vigogne, the Gazella, the Guinea Deer, and all of a similar form.

The fourth class is that of the Deer kind, with cloven hoofs, and with solid horns, that are shed every year. This class contains the Elk, the Rein deer, the Stag, the Buck, the Roe-buck, and the Axis.

The fifth class comprehends all those of the Hog kind, the Peccary, and the Babyrouessa.

The sixth class is that numerous one of the Cat kind. This comprehends the Cat, the Lion, the Panther, the Leopard, the Jaguar, the Cougar, the Jaguarette, the Lynx, the Ounce, and the Catamountain. These are all carnivorous, and furnished with crooked claws, which they can sheath and unsheath at pleasure.

The seventh class is that of the Dog kind, carnivorous, and furnished with claws like the former, but which they cannot sheath. This class comprehends the Dog, the Wolf, the Fox, the Jackal, the Isatis, the Hyæna, the Civette, the Gibet, and the Genet.

The eighth class is that of the Weasel kind, with a long, small body, with five toes or claws on each foot—the first of them separated from the rest, like a thumb. This comprehends, the Weasel, the Martin, the Pole-cat, the Ferret, the Mangoust, the Vansire, the Ermine, with all the varieties of the American Moufettes.

The ninth class is that of the Rabbit kind, with two large cutting teeth in each jaw. This comprehends the Rabbit, the Hare, the Guinea pig, all the various species of the Squirrel, the Dormouse, the Marmotte, the Rat, the Mouse, Agouti, the Paca, the Aperea, and the Tapeti.

The tenth class is that of the Hedgehog kind; with claw feet, and covered with prickles, comprehending the Hedgehog and the Porcupine, the Couando and the Urson.

The eleventh class is that of the Tortoise kind, covered with a shell, or scales. This comprehends the Tortoise, the Pangolin, and the Phataguin.

The twelfth is of the Otter, or amphibious kind—comprehending the Otter, the Beaver, the Desman, the Morse, and the Seal.

The thirteenth class is that of the Ape and Monkey kinds, with hands, and feet resembling hands.

The fourteenth class is that of winged quadrupeds, or the Bat kind, containing the Bat, the Flying Squirrel, and some other varieties.

The animals which seem to approach no other kind, either in nature or in form, but to make each a distinct species in itself, are the following: the Elephant, the Rhinoceros, the Hippopotamus, the Camelopard, the Camel, the Bear, the Badger, the Tapir, the Cabrai, the Coati, the Antbear, the Tatou, and lastly, the Sloth.

All other quadrupeds, whose names are not set down, will be found among some of the above-mentioned classes, and referred to that which they most resemble. When, therefore, we are at a loss to know the name of any particular animal, by examining which of the known kinds it most resembles, either in shape, or in hoofs, or claws; and then, examining the particular description, we shall be able to discover not only its name, but its history.*

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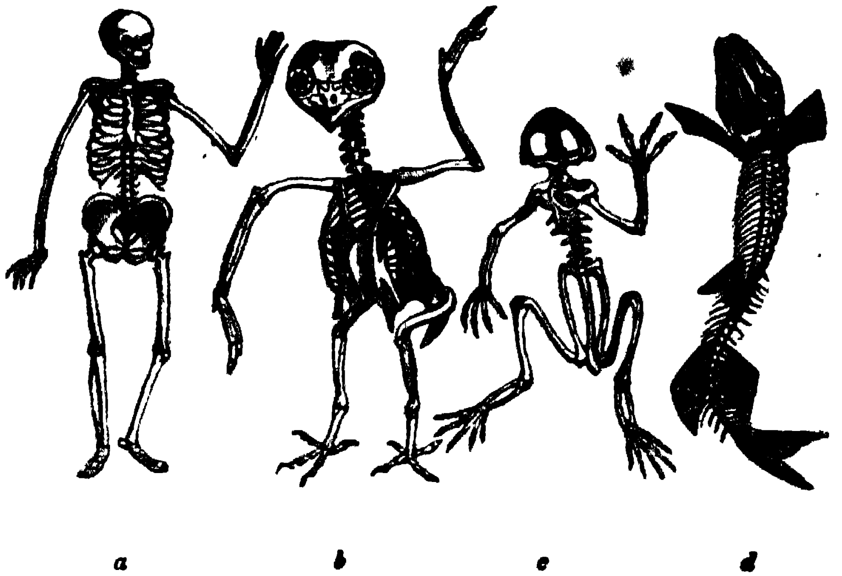
rous, it ought, says Cuvier, in some respects, to be considered as forming a particular class.

* CUVIERIAN SYSTEM OF ZOOLOGY.—Cuvier, in his *System*, thus forms the four subdivisions or classes of vertebrated animals, which are—Class 1. *Mammiferous Animals*, which bring forth their young alive and suckle them, being provided with teats, (Latin, *mammæ*,) whence the name is derived. Class 2. *Birds*. Class 3. *Reptiles*. Class 4. *Fish*. The general plan of the skeleton is the same in each class, though it admits of considerable modifications, as may be perceived by the



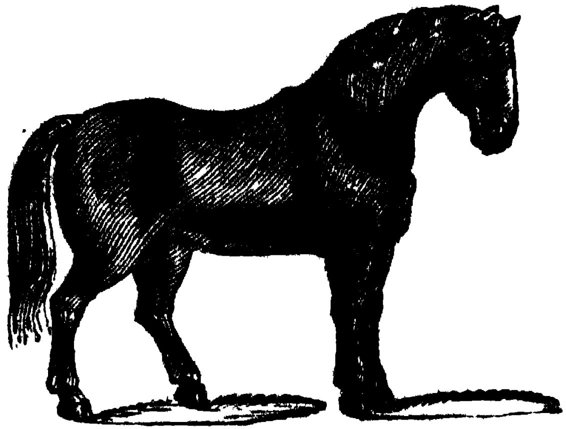
annexed figures. Fig *a* represents the human skeleton, man being placed at the head of the mammiferous class; *b*, the skeleton of a bird; *c*, that of a frog; and *d*, the skeleton of a fish. Man is pre-eminently gifted by his Creator with superior intellectual powers: he is distinguished also by his erect posture, which required a structure varying considerably from that of mammiferous quadrupeds. Had we chosen the skeleton of any of the lower orders of this class, the form would have approached more closely to those of the other classes, but taking the extremes of the grand division of vertebrated animals, we still perceive the leading characters of the osteology to be the same—namely, a skull containing the brain, supported by the vertebral column which contains the spinal cord, and to which the ribs are attached. With respect to the limbs, they admit of a great variety of form suited to the wants of the animal; and in the lowest order of the mammiferous class, which comprises dolphins and whales, we find only one pair of limbs, and in the latter, they are so concealed in the flesh as not to be visible. The upper limbs of birds do not terminate in toes or claws. Some reptiles have only one pair of limbs; others, as serpents, have none. The distinctive characters of the four classes above enumerated founded not on the form of the skeleton, but on the circulation and respiration, are thus given by Cuvier.

Mammiferous Animals have a double circulation, and the aërial respiration is simple, viz. it is effected by the lungs only. *Birds* exceed mammiferous quadrupeds in the quantity of their respiration, for they have not only a double circulation, and an aërial respiration, but they respire also through other cavities besides the lungs, the air penetrating through the whole body, and bathing the branches of the aorta, or great artery of the body, as well as those of the pulmonary artery. *Fishes* have a double circulation, but their respiratory organs (the gills) are only formed to respire by the intervention of water, and their blood only receives the portion of oxygen dissolved or mixed in the water, so that the quantity of respiration is, perhaps, less than that of the next class, reptiles. *Reptiles*.—The organs of circulation are simple, and only a portion of the blood brought back by the veins passes through the organs of respiration. Their quantity of respiration, and all the other qualities that depend on it, vary according to the proportion of blood which enters the lungs at each pulsation

In mammiferous quadrupeds the quantity of respiration is less than that of birds; but it is greater than that of reptiles, on account of the structure of the respiratory organs; and exceeds that of fishes, on account of the different elements in which they live. Hence result the four kinds of movements, which the four classes of vertebrated animals are particularly destined to exert. Mammiferous animals, in which the quantity of respiration is moderate, are generally formed to develope their strength in walking or running. Birds, which have a larger quantity of respiration, have the activity and strength of muscles necessary for flying. Reptiles, in which respiration is more feeble, are condemned to crawl, and many of them pass a part of their lives in a kind of torpor. Fishes require to be supported in an element nearly as heavy as themselves, in order to exert their proper motions in swimming. All the circumstances of organization proper to each of the four classes, and particularly those which regard their movements and exterior sensations, have a necessary relation with their essential characters; nevertheless, the class of mammiferous animals has particular characters belonging to their viviparous generation, the manner in which the fœtus is nourished in the womb by means of the placenta, and the teats with which they suckle their young. On the contrary, the other three

CHAP. II.

THE HORSE.*



Animals of the Horse kind deserve a place next to man, in a history of nature. Their activity, their strength, their usefulness, and their beauty, all contribute to render them the principal objects of our curiosity and care; a race of creatures in whose welfare we are interested next to our own. Of all the quadruped animals, the Horse seems the most beautiful;—the noble largeness of his form, the glossy smoothness of his skin, the graceful ease of his motions, and the exact symmetry of his shape, have taught us to regard him as the first, and as the most perfectly formed; and yet, what is extraordinary enough, if we examine him internally, his structure will be found the most different from that of man of all other quadrupeds whatsoever. As the ape approaches us the nearest in internal conformation, so the horse is the most remote:† a striking proof that there may be oppositions of beauty, and that all grace is not to be referred to one standard.

To have an idea of this noble animal in his native simplicity, we are not to look for him in the pastures, or the stables, to which he has been consigned by man; but in those wild and extensive plains where he has been ORIGINALLY produced, where he ranges without control, and riots in all the variety of luxurious nature. In this state of happy independence, he disdains the assistance of man, which only tends to servitude. In those boundless tracts, where he runs at liberty, he seems no way incommoded with the inconveniences to which he is subject in Europe. The verdure of the fields supplies his wants; and the climate that never knows a winter suits his constitution, which naturally seems adapted to heat. His enemies of the forest are but few, for none but the greater kinds will venture to attack him; any one of these he is singly able

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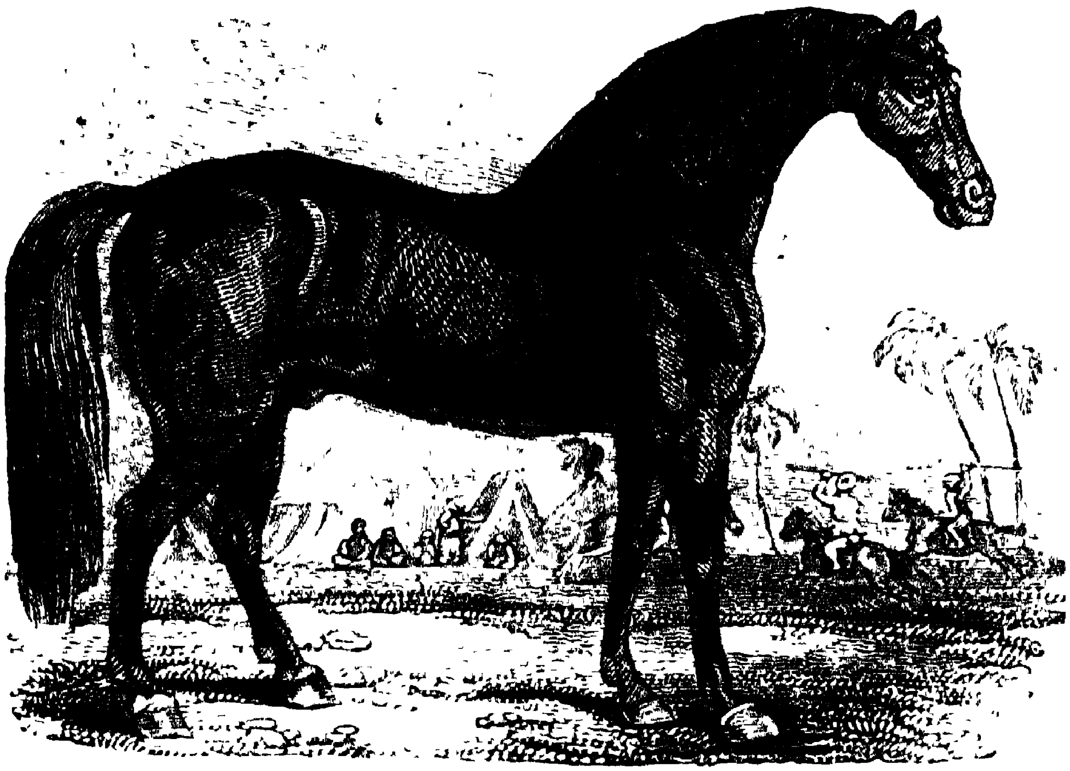
* As it may happen that, in a description where it is the aim rather to insert what is not usually known, than all that is known, some of the more obvious particulars may be omitted; I will take leave to subjoin in the notes the characteristic marks of each animal, as given us by Linnæus. The Horse, with six cutting teeth before, and single-hoofed; a native of Europe and the East, (but I rather believe of Africa); a generous, proud, and strong animal; fit either for the draught, the course, or the road; he is delighted with woods; he takes care of his hinder parts; defends himself from the flies with his tail; scratches his fellow; defends its young; calls by neighing; sleeps after nightfall; fights by kicking, and by biting also; rolls on the ground when he sweats; eats the grass closer than the ox; distributes the seed by dunging; wants a gall bladder; never vomits; the foal is produced with the feet stretched out; he is injured by being struck on the ear; upon the stiffle; by being caught by the nose in barnacles; by having his teeth rubbed with tallow; by the herb padus; by the herb phalandria; by the cruculio; by the conops. His diseases are different in different countries. A consumption of the ethmoid bones of the nose, called the glanders, is with us the most infectious and fatal. He eats hemlock without injury. The mare goes with foal 290 days. The placenta is not fixed. He acquires not the canine teeth till the age of five years.

† Histoire Naturelle, Daubenton, vol. vii. page 374.

classes are oviparous; and if we contrast them together with the first class, we shall find certain resemblances which indicate in the three classes, birds, fishes, and reptiles, a special plan of organization, comprised in the general plan of all vertebrated animals.



THE ARABIAN HORSE

[illegible] [illegible]

to overcome; while at the same time he is content to find safety in society, for the wild horses of those countries always herd together.

In these countries, therefore, the horses are often seen feeding in droves of five or six hundred. As they do not carry on war against any other race of animals, they are satisfied to remain entirely upon the defensive. The pastures on which they live satisfy all their appetites; and all other precautions are purely for their security, in case of a surprise. As they are never attacked but at a disadvantage, whenever they sleep in the forests, they have always one among their number that stands as sentinel, to give notice of any approaching danger; and this office they take by turns.*

It is not easy to say from what country the Horse came originally.† It should

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* Dictionaire Universelle des Animaux, page 19.

† Horses in Ancient Times.—There is pretty good evidence for supposing that, even at the time of the Trojan war, horses were but rare animals in Greece, and were possessed only by princes or great men, who employed them, not for the purposes of husbandry or draught, but for the ornamental displays of war and chariot-drawing, as the proud and distinctive accompaniment of royalty alone. In Judea, horses were, till the days of Solomon, very rare. Egypt is always described in the Old Testament as the land of horses. The earliest notice of the horse is in the Book of Genesis, (chap. xlvii. 17,) where Joseph is said to have given the Egyptians "bread in exchange for their horses." In the very minute enumeration of the cattle stores of Abraham, Isaac, Esau, Laban, Job, &c., in the Book of Genesis, though there is a superabundance of other quadruped property, no mention whatever is made of horses. Neither in the fourth nor tenth commandments are horses noticed with the other working animals. In the enumeration, however, of the Egyptian cattle-property affected by the murrain, horses are mentioned in precedence of the rest: "Behold, the hand of the Lord is upon thy cattle which is in the field, *upon the horses*, upon the asses, upon the camels, upon the oxen, and upon the sheep."—Exod. ix. 3. In like manner, in the excellent and very particular description given by Theocritus of the quadruped stock of Angias, the Child of the Sun, who lived in the Peloponnesus, horses find no place. Even during the Trojan war, these animals were only in the retinue of princes, and were always associated with cattle, or with the glorious forthcoming of kings. Accordingly, we find that in all the first descriptions of that animal, and particularly in that sublime and all-surpassing one in the Book of Job, he is depicted, with beauty and majesty, as the war-steed alone. Homer speaks of him always with dignity and admiration; and it is apparent, that, in his conceptions, an additional respectability is conferred upon his princes and his war-grooms by the title which he bestows upon them of "horse-tamers" and "horse-whippers," a contemptible commendation, according to our ideas, associating, as we inevitably do, these epithets with the persons and mean employments of grooms of the stable and horse jockeys. The ancient poets and ancient people must have connected, however, beauty, majesty, and sublimity, with their idea of that animal—not only from his noble shape and gallant appearance, but from his singularity, and, consequently, high price—his being the friend, as it were, and attendant, of princes—his being the terrible, yet graceful, accompaniment of war—and his being never seen, as in our modern times, degraded to the familiar, yet far more beneficial purposes of draught in our streets, and husbandry in our fields. A modern reader, therefore, must enter somewhat into the sentiments and feelings of antiquity, in order to perceive the beauty or propriety of Theocritus's comparison of Helen to a horse, or of Solomon's likening his love "to a company of horses in Pharoah's chariots." The light in which the horse is thus considered as an ornament of royalty, or an appendage of war, not only ornamental, but efficient, is explanatory of many passages, not only in the Old Testament, but in the Greek and Latin classics. In the Psalms of David,

A [illegible] horse for preservation is
But a deceitful thing.—Psalm xxxiii. 17.

And in Eccles. x. 7. "I have seen servants on horses." In Deuteronomy, chap. xvii. 16, Moses forbids the Israelites, in the event of their electing from among themselves a king, to allow him "to multiply to himself horses," and thereby foster a lust of dominion and belligerent propensities, at the same time also creating, what the lawgiver wished much to prevent, too frequent a communication with Egypt. Egypt was undoubtedly, in the most early times, the great breeder of horses: the Old Testament proves it by many references. At Jacob's funeral, in Judea, there came forth from Egypt "chariots and horsemen a very great company." The Hebrews were pursued into the Red Sea by Egyptian horsemen; horse and rider were there overwhelmed. Solomon, several centuries afterwards, obtained all his horses from Egypt. With this testimony concurs the seem that the colder climates do not agree with his constitution; for, although he is found almost in them all, yet his form is altered there, and he is found at

account given by the Greek writers; according to them, Sesostris, (or Sesouchosis, as others write his name,) was the first who taught men to tame horses and to ride them. In Solomon's days the price of a single horse from Egypt was 150 skekels, which, according to Bishop Cumberland's calculation of the shekel,* is about 17*l.* 10*s.* of our money—a great sum in those times. In the days of Xenophon, 600 years later than Solomon, the price of a good horse was about 50 danks, or 27*l.* 10*l.*: at least, such was the price paid by Senthes the Thracian to Xenophon, for the steed whereon he rode during his retreat from Babylon. Next after the Egyptians, the Assyrians became the celebrated cavaliers of the ancient world. These people are repeatedly alluded to by the Jewish prophets, not only as excelling in the beauty of their horses and skill of their horsemen, but also in all the showy apparatus of equestrian garniture. Their proficiency, however, in this branch of the military art, took place long after the Egyptians had invented and brought it to some degree of perfection, which the Medes, Assyrians, and Persians, possessing more gold and silver, from their more enlarged empires, decked and bespangled more with blue, with purple, and with gold, "clothing their horsemen most gorgeously." Persia became latterly most renowned for its horse-riding. Xenophon declares that, before the age of Cyrus, Persia had, from its want of wealth, or the mountainous character of its soil, no horses; but that, after his time, from the personal example, and encouragements, and recommendations of their king, every man in Persia rode on horseback: so much so, indeed, that it is understood that the very name of Persia, by which ever afterwards their country became known, was taken from PERESH, a word in Chaldee and Hebrew signifying a horseman. Immense numbers of these animals were reared in the plains of Assyria and Persia. We read in some author of no less than 150,000 feeding on one vast plain near the Caspian Gates. The Nysæan horses, which the kings of Persia used in their expeditions, were celebrated as the finest in the world. In Greece, the art of riding horses, and most probably the arrival of the horse himself, did not long precede the Trojan war. The story of the Centaurs, *semi-human horses and semi-equine* men, as Ovid calls them, warrants the inference that horses then first made their appearance in Thessaly, if not in Greece. These people lived about a century before the Trojan war; for Chiron, who was their chief, was the preceptor of Achilles. As the poor Mexicans at the first appearance of the Spanish cavalry ran off in a fright, conceiving that man and horse were but one animal, so the people of Thessaly fled, panic-struck, at the sight of the double-shaped, incomprehensible monster that charged them. It is almost certain that these Centaurs were a tribe of Pelasgi, or emigrants from Phrygia, and the southern shores of the Euxine Sea, which were occupied at an early period by a colony of Egyptians, planted there by Sesostris in his Phrygian and Scythian expedition. Confirmatory of this derivation is the Grecian tradition, as recorded by her antiquaries, that Philyre, the mother of the Centaurs, cohabited with Saturn in the Philyreis, an island near the southern shore of the Euxine; and that from that island she emigrated to Thessaly, and the mountains of the Pelasgi. In this way, one might amuse himself by attempting to trace, even from the few data afforded by history, the circuit by which horses, with the consequent art of equestrian exercise, passed from Egypt, the original and central riding-school of the world, into Greece and into Europe. From Egypt they passed into Assyria and Persia; from Assyria to Cappadocia, Aminazonia, and Pontus, countries where horses were most reared, most admired, and, as the most admirable objects in animated nature, offered up as sacrifices to the sun; from Pontus they passed, with the streams of westward-rushing population, to Phrygia and the southern banks of the Propontis; and from thence, with "horse-taming," Pelops and the Pelasgi, they migrated into Thessaly, and confounded, with their novel and terrifying appearance, the simple and aboriginal inhabitants, to whom "the horse and his rider" seemed a monster outlandish and inscrutable! It was not customary in these ancient times to shoe horses with iron, according to modern practice; so that a strong hoof, "hard as brass" and solid "as the flint," was reckoned one of the good qualities of a steed. In oriental countries, the dryness of the roads rendered this fortification of the hoof less necessary; the muddy ways and miriness of the ground's surface in the north of Europe, I suppose, first caused and confirmed the practice. Hannibal's cavalry, which were principally Numidian, lost all their hoofs in the miry and embarrassing march through the marshy ground between Trebia and Fesulæ. The horses of the ancients had no saddles,† no stirrups; and the Numidian horses had even once diminutive and ill-shaped. We have the testimony of the ancients that there were wild horses once in Europe; at present, however, they are totally brought under subjection; and even those which are found in America are of a Spanish breed, which being sent thither upon its first discovery, have since become wild, and have spread over all the south of that vast continent, almost to the Straits of Magellan.[*] These, in general, are a small breed, of about fourteen hands high. They have thick jaws and clumsy joints; their ears and neck also are long; they are easily tamed; for the horse by nature is a gentle, complying creature, and resists rather from fear than obstinacy. They are caught by a kind of noose, and then held fast by the legs, and tied to a tree, where they are left for two days, without food or drink.[†] By that time, they begin to

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* *If we take Xenophon's valuation of the shekel, as containing seven and a half aboli, as stated in Lib. I. of his Expedition of Cyrus, it makes the price much less, about 6l. 5s.*

† Yet I find saddles mentioned in our translation of the Bible. Leviticus xv. 9., and in Num. xxii. 21. Balaam *saddled* his ass.

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no bridles; but their armour and their trappings must have compensated for these deficiences by its extraordinary splendour.*

[*] WILD HORSES OF SOUTH AMERICA.—The wild horses which exist in the extensive plains of South America, are descendants of those introduced by the Spaniards. In the province of Cumana, there are great numbers of wild horses in the forests. They go in companies, generally to the extent of five or six hundred. They occupy the great savannas, where it is difficult to disturb or try to catch them In the dry season, they are sometimes obliged to go two or three leagues, and even more, in search of water They set out in regular ranks—four a-breast. Five or six scouts precede the troop by about fifty paces. If they perceive an enemy, they neigh, and the troop stops; if avoided, they continue their march; but if any one dare to march across their squadron, they turn on him, and crush him under their feet. No foe is capable of withstanding their attack. They have a regular chief, who marches between the scouts and the squadron—a kind of adjutant, whose duty consists in hindering any individual from quitting the ranks. If any one attempts to straggle, either from hunger or fatigue, he is bitten till he resumes his place. When wild horses are feeding, should any stragglers be threatened with an attack, by a particular signal, which they all understand, they close into a dense mass, and trample the assailant to death. When an attack is resolved upon, their leader shows the example; and if he consider a retreat necessary, he gives the signal, and it is instantly obeyed.

WILD HORSES OF NORTH AMERICA.—Herds of wild horses, the offspring of those which have escaped from the Spanish possessions in Mexico, are not uncommon on the extensive prairies that lie to the west of the Mississippi. They were once numerous on the Kootannie Lands, near the northern sources of the Columbia. They are not known to exist in a wild state to the northward of the 52nd or 53rd parallel of latitude. The young stallions live in separate herds, being driven away by the old ones, and are easily ensnared by using domestic mares as a decoy. The natives are acquainted with the Spanish-American method of taking them with the *lasso*. Major Long mentions that "horses are an object of a particular hunt to the Osages. For the purpose of obtaining these animals, which in their wild state preserve all their fleetness, they go in a large party to the country of the Red Canadian River, where they are to be found in considerable numbers. When they discover a gang of horses, they distribute themselves into three parties, two of which take their stations at different and proper distances on their route, which, by previous experience, they know the horses will most probably take when endeavouring to escape. This arrangement being completed, the first party commences the pursuit in the direction of their colleagues, at whose position they at length arrive. The second party then continues the chase with fresh horses, and pursues the fugitives to the third party, which generally succeeds in so far running them down, as to noose and capture a considerable number of them." The domestic horse is an object of great value to the Nomadic tribes of Indians that frequent the extensive plains of the Missouri, &c.; for they are not only useful in transporting their tents and families from place to place, but one of the highest objects of the ambition of a young Indian is to possess a good horse, for the chase of the buffalo—an exercise of which they are passionately fond. To steal the horse of an adverse tribe is considered to be nearly as heroic an exploit as killing an enemy on the field of battle; and the distance to which they occasionally travel, and the privations they undergo on their horse-stealing excursions, are almost incredible. An Indian who owns a horse scarcely ever ventures to sleep after night-fall, but sits at the door of his tent, with the halter in one hand, and his gun in the other, the horse's fore legs being at the same time tied together with thongs of leather. Notwithstanding all this care, however, it happens very often that the hunter, suffering himself to be overpowered by sleep for a few moments, awakes from the noise made by the thief galloping off with the animal.—*Richard's American Zoology.*

[†] CAPTURE OF THE WILD HORSE.—Cap-

* From "SHREDS OF ANTIQUITY," an unpublished work of Tennant, the author of "ANSTER FAIR."

grow manageable; and in some weeks they become as tame as if they had never been in a state of wildness. If by any accident they are once more set at liberty, they never become wild again, but know their masters, and come to their call. Some of the buccaneers have often been agreeably surprised, after a long absence, to see their faithful horses once more present themselves, with their usual assiduity, and come up, with fond submission, to receive the rein.

These American horses, however, cannot properly be ranked among the wild races, since they were originally bred from such as were tame. It is not in the new, but the old world, that we are to look for this animal, in a true state of nature; in the extensive deserts of Africa, in Arabia, and those wide spread countries that separate Tartary from the more southern nations. Vast droves of these animals are seen wild among the Tartars: they are of a small breed, extremely swift, and very readily evade their pursuers. As they go together, they will not admit of any strange animals among them, though even of their own kind. Whenever they find a tame horse attempting to associate with them, they instantly gather round him, and soon oblige him to seek safety by flight. There are vast numbers also of wild horses to the north of China; but they are of a weak, timid breed; small of stature, and useless in war.

But of all countries in the world, where the Horse runs wild, Arabia produces the most beautiful breed, the most generous, swift, and persevering.* They are found, though not in great numbers, in the deserts of that country; and the natives use every stratagem to take them. Although they are active and beautiful, yet they are not so large as those that are bred up tame. They are of a brown colour; their mane and tail very short, and the hair black and tufted. (*g*) Their swiftness is incredible; the attempt to pursue them in the usual manner of the chase, with dogs, would be entirely fruitless. Such is the rapidity of their flight, that they are instantly out of view: and the dogs themselves give up the vain pursuit. The only method, therefore, of taking them is by traps, hidden in the sand, which entangling their feet, the hunter at length comes up, and either kills them or carries them home alive. If the horse be young, he is considered among the Arabians as a very great delicacy, and they feast upon him while any part is found remaining; but if, from his shape or vigour, he promises to be serviceable in his more noble capacity, they take the usual

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tain Hall, in his Travels in Mexico and Peru, describes the manner in which the *gaucho*, or native of South America, takes the wild horse:—He first mounts an animal which has been accustomed to the sport, and gallops over the plain, in the direction where the wild herd are, and circling round, by degrees, gets near to one of them; and as soon as he has approached sufficiently near, the lasso is thrown round the two hind legs; and as the gaucho rides round a little on one side, the jerk pulls the horse's feet laterally, so as to throw him on his side, without endangering his knees or his face. Before the horse can recover the shock, the rider dismounts, and, snatching his *poncho*, or cloak, from his shoulders, wraps it round the prostrate animal's head. He then forces into his mouth one of the powerful bridles of the country, straps a saddle on his back, and, bestriding him, removes the *poncho*; upon which the astonished horse springs on his legs, and endeavours, by a thousand vain efforts, to disencumber himself of his new master.

* Where Native of? Originally.—It is an erroneous opinion that Arabia was the native country of the horse. So late as the seventh century, when the impostor Mahomet attacked Koreish, he had only two horses in his train, although in his retreat he had 24,000 camels and 40,000 sheep. Horses are not mentioned at all as forming part of the booty. The fact is, Arabia is comparatively, a recent breeding country. In the second century, horses were imported into Arabia, from Egypt. This last country seems more likely to have been the country of the horse; for in 2 Chronicles, chap. ix., it is said that Solomon obtained gold and silver from that country; and in the 28th verse, it is added, that "they brought unto Solomon horses out of Egypt, and out of all lands." Solomon is said to have had "four thousand stalls for horses and chariots, and twelve thousand horsemen."

From the fact of the horse roving in wild liberty in the plains of Asia at this day, and by tradition from all time, we may conclude that he was originally incidental to that continent. One thing is certain, that he was not found either in America or New Holland, at the original discovery of these continents.

(*g*) Marm. Descript. de l'Afrique, lib. i. p. 51.

LAPLANDERS AND REIN-DEER

SHOOTING DEER BY LAMP-LIGHT.

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methods of taming him, by fatigue and hunger; and he soon becomes a useful and domestic animal.

There is scarce an Arabian, how poor soever, but is provided with his horse.(g) They in general make use of mares in their ordinary excursions; experience having taught them that they support fatigue, thirst, and hunger, better than the horses are found to do; they are also less vicious, of a gentler nature, and are not so apt to neigh. They are more harmless, also, among themselves, not so apt to kick or hurt each other, but remain whole days together without the least mischief. The Turks, on the contrary, are not fond of mares; and the Arabians sell them such horses as they do not choose to keep for stallions at home. They preserve the pedigree of their horses with great care, and for several ages back.* They know their alliances and all their genealogy; they distinguish the races by different names, and divide them into three classes. The first is that of the nobles, the ancient breed, and unadulterated on either side; the second is that of the horses of the ancient race, but adulterated; and the third is that of the common and inferior kind. The last they sell at a low price; but those of the first class, and even of the second, amongst which are found horses of equal value to the former, are sold extremely dear. They know, by long experience, the race of a horse by his appearance; they can tell the name, the surname, the colour, and the marks properly belonging to each. When they are not possessed of stallions of the noble race themselves, for their mares, they borrow from their neighbours, paying a proper price as with us, and receive a written attestation of the whole. In this attestation is contained the name of the horse and the mare, and their respective genealogies. When the mare has produced her foal, new witnesses are called, and a new attestation signed, in which are described the marks of the foal, and the day noted when it was brought forth. These attestations increase the value of the horse; and they are given to the person who buys him. The most ordinary mare of this race sells for five hundred crowns; there are many that sell for a thousand; and some of the very finest kinds, for fourteen or fifteen hundred pounds. As the Arabians have no other house but a tent to live in, this also serves them for a stable; so that the mare, the foal, the husband, the wife, and the children, lie altogether indiscriminately. The little children are often seen upon the body or the neck of the mare, while these continue inoffensive and harmless, permitting them thus to play with and caress them without any injury.* The Arabians never beat their horses: they treat them gently; they speak to them, and seem to hold a discourse; they use them as friends; they never attempt to increase their speed by the whip, nor spur them but in cases of necessity. However, when this happens, they set off with amazing swiftness; they leap over obstacles with as much agility as a buck; and, if the rider happens to fall, they are so manageable, that they stand still, on command, in the midst of their most rapid career. The Arabian horses are of the middle size, easy in their motions, and rather inclined to leanness than fat.

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* PEDIGREE OF ARAB HORSES.—The Arabs divide their horses into two races. One, in no great repute, and appropriated to servile uses, the name *Kadischi*, which means, *horses of an unknown race.* The second they call *Kochlani*, which means, *horses whose genealogy is known for two thousand years.* The race, say the Arabs, originated from the studs of Solomon. The individuals composing it are sometimes sold at such enormous prices as appear almost incredible. In the breeding of Kochlani horses, the Arabs use the utmost precaution, to avoid being deceived on the point of genealogy. The mares are covered in the presence of a witness, who remains near them twenty days, to make sure that they are not dishonoured by any vulgar stallion. The same witness must also be present at the accouchement; and a certificate of the legitimate birth of the colt is made out within seven days after the event. These precautions show how amazingly jealous the Arabs are of preserving their better race horses in the most untainted purity of descent.—GRIFFITH.

The following pedigree of an Arabian horse, which was purchased in Egypt during the war against the French, by Colonel Ainslie, was hung round the neck of the animal:

In the name of God, the merciful and compassionate, and of Saed Mahomed, agent of the High God, and of the companions of Mohammed, and of Jerusalem. Praised be the Lord, the Omnipotent Creator.

This is a high-bred horse, and its colt's tooth is here in a bag about his neck, with his pedigree, and of undoubted authority, such as no infidel can refuse to believe. He is the son of Rabbamy, out of the dam Labadah, and equal in power to his sire; of the tribe of Zashalah; he is finely moulded, and made for running like an ostrich. In the honours of relationship, he reckons Zaluah sire of Mahat, sire of Kallac, and the unique Alket sire of Manasseh, sire of Alsheh, father of the race down to the famous horse, the sire of Lahalala; and to him be ever abundance of green meat, and corn, and water of life, as a reward from the tribe of Zazhalah; and may a thousand branches shade his carcass from the hyæna of the tomb, from the howling wolf of the desert; and let the tribe of Zazhalah present him with a festival within an inclosure of walls; and let thousands assemble at the rising of the sun in troops hastily, where the tribe holds up under a canopy of celestial signs within the walls, the saddle with the name and family of the possessor. Then let them strike the bands with a loud noise incessantly, and pray to God for immunity for the tribe of Zoab, the inspired tribe.

(g) Buffon.

Next to the Barb, travellers generally rank the Spanish genette.† These horses, like the former, are little, but extremely swift and beautiful. The head is something of the largest; the mane thick; the ears long, but well pointed; the eyes filled with fire; the shoulders thickish; and the breast full and large. The croup round and large; the legs beautiful, and without hair; the pastern a little of the longest, as in the Barb, and the hoof rather too high.

The Italian horses were once more beautiful than they are at present, for they have greatly neglected the breed. Nevertheless, there are still found some beautiful horses among them, particularly among the Neapolitans, who chiefly use them for the draught.

The Danish horses are of such an excellent size, and so strong a make, that they are prefered to all others for the draught. There are some of them perfectly well shaped; but this is but seldom seen, for in general they are found to have a thick neck, heavy shoulders, long and hollow back, and a narrow croup; however, they all move well, and are found excellent both for parade and war. They are of all colours, and often of whimsical ones, some being streaked like the tiger, or mottled like the leopard.

The German horses are originally from Arabian and Barbary stocks; nevertheless they appear to be small and ill-shaped; it is said also that they are weak and washy, with tender hoofs. The Hungarian horses, on the other hand, are excellent for the draught, as well as the saddle. The Hussars, who use them in war, usually slit their nostrils,—which is done, as it is said, to prevent their neighing, but, perhaps, without any real foundation.

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* ATTACHMENT OF HORSES TO THE HUMAN SPECIES.—The horse is susceptible of a very great attachment to the human species, when properly treated. A good deal, however, that is repeated on this head in authors, borders on the marvellous: as, for instance, the stories of Bucephalus; the anecdote of a horse belonging to a Scythian prince, which trampled to death the murderer of his master; and that of the horse of Nicomedes, which, through grief for his death, suffered itself to perish of hunger. The following anecdote on the subject, however, is well authenticated.

"The Tyrolese, in one of their insurrections, in 1809, took fifteen Bavarian horses; they mounted them with as many of their men; but in a rencontre with a squadron of the regiment of Bubenhoven, when these horses heard the trumpet, and recognised the uniform of the regiment, they set off at full gallop, and carried their riders, in spite of all their efforts, into the Bavarian ranks, where they were made prisoners! Education develops the powers of horses to a very considerable extent

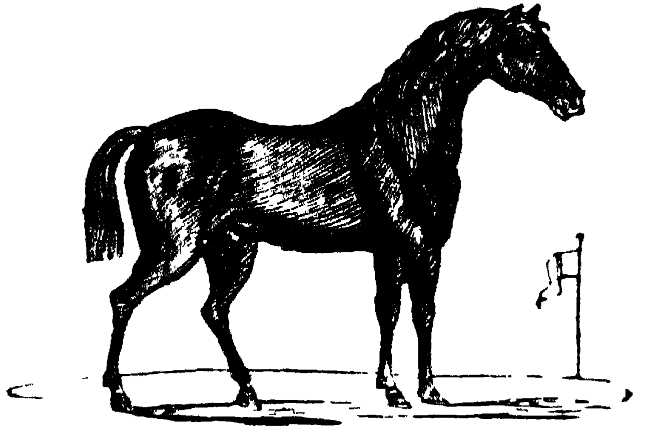
† SPANISH HORSES.—Spain was early celebrated for a breed of fine horses. In an old poem, quoted by Strutt, entitled the "Squyer of Low Degree," the King of Hungary promises his daughter, that in the morning she shall go with him on a hunting party, arrayed most gorgeously, and riding in a chariot covered with red velvet, drawn by

> Jenettes of Spain, that ben so whitte
> Trapped to the ground with velvet bright.

These took their rise in the Moorish barb, when that peninsula was subject to that people, When Rome was at its highest splendour, the horses of Calpe were in high repute. Calpe, the modern Gibraltar, is situated at the south-western extremity of Spain, opposite the Barbary coast; and from thence horses were imported; hence the origin of the genettes. The Spanish horses are well made and handsome, as well as very active and nimble; they have good eyes, handsome legs and heads, and are easily managed.

The Dutch breed is good for the draught, and is generally used for that purpose over Europe: the best come from the province of Friezland. The Flanders horses are much inferior to the former: they have most commonly large heads, flat feet, and swollen legs, which are an essential blemish in horses of this kind.

The French horses are of various kinds; but they have few that are good.* The best horses of that country come from Limosin; they have a strong resemblance to the Barb, and, like them are excellent for the chase; but they are slow in coming to perfection: they are to be carefully treated while young, and must not be backed till they are eight years old. Normandy furnishes the next best; which, though not so good for the chase, are yet better for war. In general, the French horses have the fault of being heavy-shouldered, which is opposite to the fault of the Barb, which is too thin in the shoulder, and is consequently apt to be shoulder-slipt.†



Such are the different accounts we have of the various races of horses in different parts of Europe. I now come to speak of one particular breed, more excellent than any that either the ancients or moderns have produced—and that is our own It is not without great assiduity, and unceasing application, that the English horses are now become superior to those of any other part of the world, for size, strength, swiftness, and beauty. It was not without great attention, and repeated trials of all the best horses in different parts of the world, that we have thus been successful in improving the breed of this animal: so that the English horses are now capable of performing what no others ever could attain to. By a judicious mixture of the several kinds, by the happy difference of our soils, and by our superior skill in management, we have brought this animal to its highest perfection. An English horse, therefore, is now known to excel the Arabian in size and swiftness; to be more durable than the Barb, and more hardy than the Persian. An ordinary racer is known to go at the rate of a mile in two minutes; and we had one instance, in the admirable Childers, of still greater rapidity.* He has been frequently known to move above eighty-two feet and a half in a second, or almost a mile in a minute; he has run also round the course of Newmarket, which is very little less than four miles, in six minutes and forty seconds. But what is surprising, few horses have been since found that ever could equal him, and those of his breed have been remarkably deficient.

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* **French Horses.**—In France, horses of the Bretagne breed are strongly made, and have generally black hair, or brown bay; and good legs and feet, with a hardy mouth, and a head short and clumsy. The horses of Franche Comté are said to have the legs of tigers and the belly of a hind; but they are short and thick, and of the middle size, being much more proper for drawing than riding. The horses of Gascony are not unlike those of Spain; but they are not so handsome and active. Besides these, there are the horses of Normandy, Bretagne, Poitou, &c.—all differing from each other in some essential degree; for France, in its great extent, has various breeds. Great exertions have been made in that country to cope that animal against those of England. The Emperor Napoleon used every means to procure some of our best blood ones; and he imported largely from Arabia. But all efforts have proved abortive, notwithstanding the French nobility have gone so far as to procure English grooms and jockies to manage their horse-flesh. The beauty, strength, and fleetness of our horses are unapproachable. Our continental brethren then turn round upon us, and decry the want of *weight* in our breeding They had weight enough at Waterloo, in all conscience. With the weight of his cuirassiers, the victor of Austerlitz and Marengo hoped to bear down all opposition, and strike the decisive blow. It failed—our cavalry charged—and though the relative courage and *esprit du corps* of French and British soldiers may be a matter of opinion, the superiority of English over French horse-flesh requires no ghost from the grave to decide.—Ed.

† **Swedish Horses.**—To the list of the horses most usually known in Europe may be added those of Sweden. "The Swedish horses in general," says Mr. Lloyd, in his Field Sports of the North of Europe, "are small, though hardy, and capable of considerable exertion; their manes and tails are usually left in a state of nature; they are seldom cleaned, and when in the stable, even in the most severe weather, are rarely littered down This treatment of their horses arises as well from ignorance as neglect, on the part of the peasants. In saying this, however, I am willing to admit that many of them are almost as fond of these animals as if they were their own children. The average price of a good horse of the description I am now speaking of, may be taken at from 5*l.* to 8*l.*"

However this be, no horses can any way equal our own, either in point of swiftness or strength; and these are the qualifications our horsemen seem chiefly to value. For this reason, when the French, or other foreigners, describe our breed, they all mention, as a fault, the awkward and ungainly motion of our horses: they allow them to be very good indeed, but they will not grant them an easy or an elegant carriage.(*g*) But these writers do not consider that this seeming want of grace is entirely the result of our manner of breaking them.† We consult only speed and dispatch in this animal's motions; the French and other nations are more anxious for parade and spirit. For this reason we always throw our horses forward, while they put them upon their haunches;—we give them an easy swift gait of going, that covers a great deal of ground; they, on the contrary, throw them back, giving them a more showy appearance indeed, but one infinitely less useful. The fault of our manner of breaking is, that the horse is sometimes apt to fall forward. The French managed horse never falls before, but more usually on one side; and for this reason, the rider wears stiff boots, to guard his legs against such accidents. However, it would be a very easy matter to give our horses all that grace which foreigners are so fond of; but it would certainly take from their swiftness and durability.

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* FLYING CHILDERS.—This celebrated horse was the property of the Duke of Devonshire; and it is allowed to be the fleetest horse that ever was bred in the world. He never was beaten. He won in prizes upwards of 20,000*l.*, and was then reserved for breeding. The sire of Childers was an Arabian, sent by a gentleman as a present to his brother in England. Childers was foaled in 1715, and was the property of Leonard Childers, Esq., of Carr House, near Doncaster, and sold when young to the Duke of Devonshire. His racing career commenced at five or six. He ran over the Beacon course, which is four miles, one furlong, and one hundred and thirty-eight yards, in seven minutes and thirty seconds—covering at every bound a space of about five-and-twenty yards. On one occasion he sprung a leap, with his rider on his back, on level ground, of twenty-five feet. Childers was somewhat more than fifteen hands in height. He died in the Duke of Devonshire's stud, in 1741, aged twenty-six years. He is justly esteemed the paragon and prince of horses.

† MOTIONS AND ACTIONS OF QUADRUPEDS.—It is asserted by physiologists that the right side of animals is generally stronger than the left; and it is said by riding-masters that horses most naturally gallop with the left foot foremost, which they attribute to the foal being commonly placed, before birth, with its head to the left. All these facts, however, must be admitted with some hesitation: the first thing to be asked is, what is meant by galloping with the right or left foot foremost; and we shall find that the foremost foot is always most bent, and is put down singly, and then, after some pause, the foot diagonally opposite; and then, after a shorter pause, the two others almost at the same instant; these two remaining parallel to each other, and appearing to be the most energetically employed in the progressive motion. So that, in fact, when the horse gallops with the left foot foremost, the principal effort seems to be made by the right foot before, and the left foot behind, and neither the right nor left side of the body in general can be said to be called into action more than the other. It is curious to observe the *association of ideas*, or of *impressions*, by which the actions of horses are sometimes regulated. A young horse, which had been very *well* taught to go in the usual manner with the right leg foremost, could not be persuaded by any art to depart from his instructions; till, after vain efforts for several months to make his paces more classical, his rider recollected that he had once or twice slightly started at a particular spot in the road, and gone off with the left foot; he determined to make trial of the association with this spot, and having succeeded almost at once in the experiment, he put out his left hand to caress the animal's neck; and this motion was soon understood as a signal for the same pace, so that by thrusting forwards the left hand, the object was attained in any other part of the road, until the leg was substituted for the arm, in the regular manner.

(*g*) See Buffon's account of our horses.

But in what degree of contempt soever foreigners might formerly have held our horses, they have for some time perceived their error, and our English hunters are considered as the noblest and the most useful horses in the world. Our geldings are, therefore, sent over to the continent in great numbers, and sell at very great prices; as for our mares and stallions, there is a law prohibiting their exportation; and one similar to this, is said to have been obtained even as early as the times of Athelstan, who prohibited their exportation, except where designed as presents.*

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* **Horses in Great Britain.**—In our own country, the breed of horses is very ancient, as Julius Cæsar mentions, that on his first invasion, the Britons had great numbers well trained to warlike exercises. The Romans, probably, contributed little to the improvement of the British breed of horses, since no traces of amendment are to be found during so many ages.

A.D. 631.—According to Berenger, the venerable Bede says, that the English began to use saddle-horses about this period, when prelates and others rode on horseback.

A.D. 924.—Strutt, in his "Sports and Pastimes," informs us that several race-horses were sent by Hugh Capet, in the ninth century, as a present to Athelstan, when he was soliciting the hand of Ethelswitha, his sister; and the first indications of a sport of this kind occurs in a description of London, written by Fitzstephen, who lived in the reign of Henry II. He informs us that horses were usually exposed to sale in West Smithfield; and in order to prove the excellency of the most valuable hackneys and charging-horses, they were matched against each other. In the old metrical romance of "Sir Bevis of Southampton," it is said—

In somer, in Whitsontyde,
When knights most on horseback ride,
A courselet they make on a day,
Steeds and palfrey for to essaye;
Which horse that best may ren,
Three miles the course was then,
Who that might ryde him shoulde
Have forty pounde of ready golde.

A.D. 1066.—William the Conqueror brought many horses with him from Normandy, and encouraged their breed in England; but Roger de Bellesne, created Earl of Shrewsbury by that monarch, rendered an essential service to the nation, by introducing stallions of Spain into his estate, in Powisland, and through them, perhaps, a nobler breed than this kingdom had ever known. Cambrensis takes notice of them; and Michael Drayton, the poet, celebrates their excellence: he confirms Fitzstephens's account of racing in Smithfield.

A.D. 1189.—In the romance of "Richard I." coeval with Sir Bevis, we find that swift running horses were rated at prodigious prices. In an old poem, which celebrates Richard I., it is said, that in the camp of the Emperor, as he is called, of Cyprus,

Two steedes founde King Richarde,
That von Favell, that other Lyard:
Yn this worlde they had no pere,
Dromedary, rabyte, ne cammele,
Goethe none so swifte without fayle:
For a thousand pounde of golde,
Ne shoulde the one be solde.

A.D. 1199.—Running horses are frequently mentioned in the registers of royal expenditure; and King John was so fond of swift horses and dogs for the chase, that he accepted many of them in lieu of fines.

A.D. 1307 to 1377.—Edwards II. and III. imported horses from the continent—large, strong animals, fit to carry armed men. Sir Thomas Chaloner, who wrote in the early part of Elizabeth's reign, mentions Henry VIII. as a great admirer of horses, and of his having imported some from Turkey, Naples, Spain, and Flanders, to improve their breed. The light and fleet breed of horses originated with the invention of gunpowder and general use of fire-arms; the heavy armour falling into disrepute, a lighter and more active sort of horse was rendered necessary. In the reign of Edward III., there were running horses purchased for the king's service, at the price of 13*l.* 6*s.* 8*d.* each, and in the 9th year of his reign, the King of Navarre sent him a present of two running horses, which must have been very valuable, for the king gave the person who brought them no less than a hundred shillings reward.

We now collect but little of the history of the horse, and pass on to

A.D. 1588, in the time of Elizabeth, when race horses were prized on account of their breed, as appears by the following passage in one of Bishop Hall's satires—

Dost thou prize
Thy brute beast's worth by their dam's qualities;
Sayst thou thy colt shall prove a swift-paced steed,
Only because a Jennet did him breed?
Or sayst thou this same horse shall win the prize,
Because his dam was swiftest Truchetico
Or Runcevall his sire, himself a gallaway,
While, like a tireling [illegible]ags half way?

Roger de Belegme, created Earl of Shrewsbury by William the Conqueror,(g) is the first who is recorded to have made attempts towards the mending our native breed. He introduced Spanish stallions into his estate at Powisland, in Wales, from which that part of the country was for many ages after famous for a swift and generous race of horses. However, at that time, strength and swiftness were more regarded than beauty; the horses' shapes, in time of action, being entirely hid by a coat of armour, which the knights then usually put upon them, either by way of ornament or defence.

The number of our horses, in London alone, in the time of King Stephen, is said to have amounted to 20,000. However, long after, in the times of Queen Elizabeth, the whole kingdom could not supply 2,000 horses to form our cavalry. At present, the former numbers seem revived; so that, in the late war, we furnished out above 13,000 horsemen, and could, if hard pushed, supply above four times that number. How far this great increase of horses among us may be beneficial, or otherwise, is not the proper business of the present page to discuss; but certain it is, that where horses increase in too great a degree, men must diminish proportionably; as that food which goes to supply the one, might very easily be converted into nourishment to serve the other. But, perhaps, it may be speculating too remotely, to argue for the diminution of their numbers upon this principle, since every manufacture we export into other countries takes up room, and may have occupied that place,

A.D. 1602.—In the reign of James, public races were established in many parts of the kingdom. The races were called bell-courses, because the prize was a silver bell. Gatherley in Yorkshire, Croydon. and Enfield Chase, when the king was resident, were the spots where the races were run. James gave 500*l.* for an Arabian horse, bought of Mr. Markham, the first of that country brought to England.

A.D. 1640.—Races were held at Newmarket, although the round course was not made until 1666. In Charles the First's time, mention is made of the scarcity of able horses in the kingdom, from the strong addiction which the people now had to racing and hunting-horses, which were sacrificed for lightness of mould and swiftness. In this king's reign, it was customary to have races in Hyde Park, which we glean from a comedy called the "Merry Beggars," (1641)—"Shall we make a fling to London, and see how the spring appears there, in Spring Garden, and in Hyde Park, to see the races, horse and foot?"

A.D. 1660.—Burton, in his "Anatomy of Melancholy," mentions horse-races as the disports of great men, though he quaintly laments, that by such means many gentlemen gallop quite out of their fortunes. During the interregnum, Cromwell, with his wonted sagacity, seeing it the interest of the country, had his stud of racers. After the Restoration, Charles II. honoured the pastime especially. He established the breed of our present race of running horses, by importing mares from Barbary. When he resided at Windsor, he appointed races to be run in Datchet mead, and at Newmarket, where he entered horses, and run them in his own name. He occasionally visited other racing-places,—Burford Down, in particular, by the following doggerel, written in 1690:

> Next, for the glory of the place,
> Here has been rode many a race:
> King Charles the Second I saw here,
> But I've forgotten in what year;
> The Duke of Monmouth here also,
> Made his horse to sweat and blow;
> Lovelace, Pembroke, and other gallants,
> Have been venturing here their talents;
> And Nicholas Bainton, on black Sloven,
> Got silver plate by labour and drudging.

A.D. 1681.—William III. was also a patronizer of this pastime; and his queen not only continued the bounty of her royal predecessors, but several plates to former donations. The prizes were now more valuable than formerly, and were estimated at 100 guineas each.

A.D. 1720.—George I., instead of a piece of plate, gave 100 guineas in money. By instituting royal plates, additional encouragement was given to horse-racing;—emulation was promoted among the breeders, with the judicious view of perfecting and extending a race of horses fit for the road, the chase, and for war. From the period of the middle of the 17th century to the 18th, the system of improvement was zealously pursued. The importation of brood mares and stallions, and the eastern stock which was engrafted upon our national breed, soon evidenced a superiority over the very best original stock, and raised the character of British horses above that of every other country in the world.

(g) British Zoology, vol. i. p 4. To this work I am indebted for several particulars, with regard to the native animals of this island.

which, in a state of greater simplicity, might have given birth and subsistence to mankind, and have added to population.

Be this as it will, as we have been at such expense and trouble to procure an excellent breed of horses, it is not now to be expected that we should decline the advantages arising from it, just when in our possession. It may be, therefore, the most prudent measure in our legislature, to encourage the breed, as a useful branch of commerce, and a natural defence to the country. But how far this end is answered by the breeding up of racers, is what most persons versed in this subject are very apt to question. They assert, that the running-horse, as the breed has been for a long time refined, is unfit for any other service than that of the course, being too slight either for the road, the chase, or the combat; and his joints so delicately united, as to render him subject to the smallest accidents. They, therefore, conclude that less encouragement given to racing would be a means of turning us from breeding rather for swiftness than strength; and that we should thus be again famous for our strong hunters, which they say are wearing out from among us.*

How far this may be fact, I will not take upon me to determine, being but little versed in a subject that does not properly come within the compass of natural history. Instead, therefore, of farther expatiating on this well-known animal's qualifications, upon which many volumes might easily be written, I will content myself with just mentioning the description of Camerarius, in which he professes to unite all the perfections which a horse ought to be possessed of.

"It must," says he, "have three parts like those of a woman: the breast must be broad, the hips round, and the mane long. It must in three things resemble a lion: its countenance must be fierce, its courage must be great, and its fury irresistible. It must have three things belonging to the sheep: the nose, gentleness, and patience. It must have three of a deer: head, leg, and skin. It must have three of a wolf: throat, neck, and hearing. It must have three of a fox: ear, tail, and trot. Three of a serpent: memory, sight, and flexibility. And, lastly, three of a hare: running, walking, and perseverance.†

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* **General Character of British Horses.**—The breed of horses in Great Britain is now as mixed as that of its inhabitants; the frequent introduction of foreign horses has given us a variety that no other single country can boast; most other countries producing only one kind; while ours, by a judicious mixture of the several species, by the happy difference of our soils, and by our superior skill and management, has brought each quality of this noble animal to the highest perfection. In the annals of Newmarket may be found instances of horses that have literally outstripped the wind, as the celebrated M. Condamine has shown in his remarks on those of Great Britain. Childers, as mentioned by Goldsmith, is an unparalleled instance of rapidity—*a mile in a minute!* The species used in hunting is a happy combination of the former with others superior in strength, but inferior in point of speed and lineage: a union of both is necessary; for the fatigues of the chase must be supported by the spirit of the one, as well as by the vigour of the other. No country can bring a parallel to the strength and size of our horses destined for the draught, or to the activity and strength united of those that form our cavalry. In London, there are instances of single horses that are able to draw on a plain, for a small space, the weight of *three tons!* But the most remarkable proof of the strength of our British horses is to be drawn from that of our mill-horses; some of these will carry, at one load, thirteen measures, which at a moderate computation of seventy pounds each, will amount to 916 pounds. Our cavalry in the late campaigns (when they had an opportunity) showed, over those of our allies, as well as the French, a great superiority both of strength and activity; the enemy was broken through by the impetuous charge of our squadrons; when the German horses, from their great weight and inactive make, were unable to second our efforts.

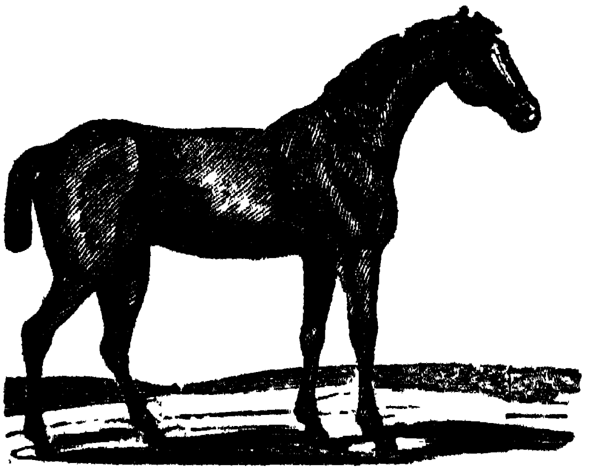
† **Curious Natural Fact.**—It is a curious natural fact, that the horse has the singular property of breathing through the nostrils only, and not through the mouth; for in the severest exercises, the mouth is never seen open, unless the lower jaw be brought down violently by force of the bit. This may account for the great dilation of the nostrils after hard running.—Turton.

Docking Horses' Tails.—It is a wonder to us that the admirers of beauty in horse-flesh continue to exercise the barbarous custom of docking the tails and cutting the ears of horses. The animal is thus deprived of two parts, instrumental to its own comfort, and of utility to us. The funnels of the ears are destroyed, and the horse is rendered deaf; but the loss of the tail subjects them to even greater inconvenience. During summer, innumerable myriads of insects torment and goad them—sucking their blood, and depositing their eggs in the rectum. These they have no means of lashing off; and they are deprived of the exercise of the tail in winter, as a necessary protection against cold. And in no other nation than this is the vicious system of *nicking* adopted. As Captain Brown observes, "It is a most affecting sight to go into a stable, and there behold a range of fine and beautiful steeds, with their tails cut and slashed, tied up by pullies to give them force, suffering such torture, that they sometimes never recover the savage gashes they have received. And for what is all this done? That they may hold their tails somewhat higher than they otherwise would, and be for ever after deprived of the power of moving the joints of them as a defence against flies."

TO JUDGE OF THE AGE OF A HORSE.—There are various ways of judging of the age of a horse. The following are the most general: The eye-pits of old horses are commonly hollow; but that mark is equivocal, young horses begot by old stallions having them also hollow. The teeth afford the best criterion of the age of horses. The horse has, in all, forty teeth—viz twenty-four grinders, four canine teeth or tusks, and twelve fore-teeth. Mares have either no tusks, or very short ones. Five days after birth, four teeth in front begin to shoot; these are called nippers, and are cast at the age of two years and a half. They are soon renewed; and the next year he again casts two above and two below, one on each side of the nippers. At four years and a half other four teeth fall out next those last placed. These last four foal teeth are succeeded by other four, which grow much more slowly than the first eight; and it is from these last four corner teeth that the age of the horse is distinguished: they are somewhat hollow in the middle, and have a black mark in the cavities. At five years, these teeth scarcely rise above the gums; at six, their cavities begin to fill up, and turn to a brownish spot, like the eye of a garden bean; and before eight years, the mark generally disappears. The tusks generally indicate the age of the horse; those in the under jaw generally shoot at the age of three years and a half, and the two in the upper jaw at four. Till six, they continue sharp at the points; but at ten, they appear long and blunt. These are the general rules for ascertaining the age of the horse; but there are frequent exceptions, as some horses retain the mark two or three years longer—CAPTAIN THOMAS BROWN.

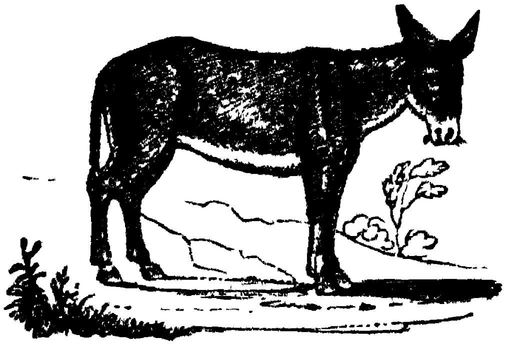
SAGACITY.—Horses will sometimes show resentment of injuries. I went to see a fine hunter, who appeared perfectly docile when I went up to him. This his owner did not dare to do; and when he came into the stable, the noble animal was quite furious. He had been ill-treated by his master, who had frequently beaten him severely when there was no occasion for it.—JESSE'S GLEANINGS IN NATURAL HISTORY.

STRANGE MODE OF CURING A VICIOUS HORSE.—I have seen vicious horses in Egypt cured of the habit of biting, by presenting to them, while in the act of doing so, a leg of mutton just taken from the fire. The pain which a horse feels in biting through the hot meat causes it, after a few lessons, to abandon the vicious habit.—BURCKHARDT.



CHAP. III.

THE ASS.(g)



Although this animal is very easily distinguished from the horse at first sight, yet, upon closer inspection, the similitude between them is very striking.* They have both a similar outline in the external parts; the same conformation within. One would be led, from the great resemblance there is between them, to suppose them of the same species, and that the ass was only a horse degenerated; however, they are perfectly distinct, and there is an inseparable line drawn between them, for the mule they produce is barren. This seems to be the barrier between every species of animals;—this keeps them asunder, and preserves the unities of their form. If the mule, or the monster bred between two animals whose form nearly approaches, is no longer fertile, we may then conclude that these animals, however resembling, are of different kinds. Nature has providentially stopped the fruitfulness of these ill-formed productions, in order to preserve the form of every animal uncontaminated. Were it not for this, the races would quickly be mixed with each other; no one kind would preserve its original perfection—every creature would quickly degenerate, and the world would be stocked with imperfection and deformity.

The horse and the ass, therefore, though so nearly approaching in form, are of two distinct kinds, different in their natures; and were there but one of each kind, both races would then be extinguished. Their shapes and their habits may, indeed, be very nearly alike; but there is something in every animal, beside its conformation or way of life, that determines its specific nature. Thus there is much greater resemblance between the horse and the ass, than between the sheep and the goat; and yet the latter produce an animal that is by no means barren, but which quickly re-produces an offspring resembling the sheep; while the mule of the former is marked with certain sterility. The goat and the sheep may be, therefore, said to be of one kind, although so much unlike in figure; while the horse and the ass are perfectly distinct, though so closely resembling. It has, indeed, been said by Aristotle, that their male is sometimes prolific; this, however, has not been confirmed by any other testimony, although there has elapsed a period of near two thousand years to collect the evidence.

But what tends to put the subject out of dispute is, that the two animals are found in a state of nature entirely different. The onager, or wild ass, is seen in still greater abundance than the wild horse; and the peculiarities of its kind are more distinctly marked than in those of the tame one. Had it been a horse degenerated, the likeness would be stronger between them, the higher we went to the original stock from whence both have been supposed to be sprung. The wild animals of both kinds would, in such a case, resemble each other much more than those of the tame kind, upon whom art has, for a succession of ages, been exercising all its force, and producing strange habits and new alterations. The contrary, however, obtains, and the wild ass is even more assinine, if I may so express it, than that bred in a state of domestic servitude: and has even a natural aversion to the horse, as the reader will shortly learn.

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* The head of an Ass is large and thick; the ears very long; the mane short and erect, with a dark-brown stripe from the shoulders to the insertion of the tail, which is thick, covered with short hairs, and stunted towards the end. The ass is three or four years in coming to perfection; but will propagate when two years old, and will continue to do so till about twenty-five years of age. The female goes with young eleven months, and rarely brings forth more than one at a time. The ass sleeps standing, and requires much less repose than the horse.

(g) Many parts of this account are extracted from Daubenton and Buffon; which I mention here, to avoid troubling the reader with a multiplicity of quotations.

The wild ass has, by some writers, been confounded with the zebra; but very improperly, for they are of a very different species. The wild ass is not streaked like the zebra, nor is his shape so beautiful; his figure is pretty much the same as that of the common ass, except that he is of a brighter colour, and has a white list running from his head to his tail. This animal is found wild in many islands of the Archipelago, particularly in that of Cerigo. There are many wild asses in the deserts of Lybia and Numidia, that run with such amazing swiftness, scarce even the coursers of the country can overtake them. When they see a man, they set up a horrid braying, and stop short altogether, till he approaches near them; they then, as if by common consent, fly off with great speed; and it is upon such occasions that they generally fall into the traps which are previously prepared to catch them. The natives take them chiefly upon account of their flesh, which they esteem as delicious eating; and for their skins, of which that kind of leather is made which is called shagreen.*

The ass, like the horse, was originally imported into America by the Spaniards, and afterwards by other nations. That country seems to have been peculiarly favourable to this race of animals; and where they have run wild, they have multiplied in such numbers, that in some places they are become a nuisance. (g) In the kingdom of Quito, the owners of the grounds where they are bred suffer all persons to take away as many as they can, on paying a small acknowledgment, in proportion to the number of days their sport lasts. They catch them in the following manner:—A number of persons go on horseback, and are attended

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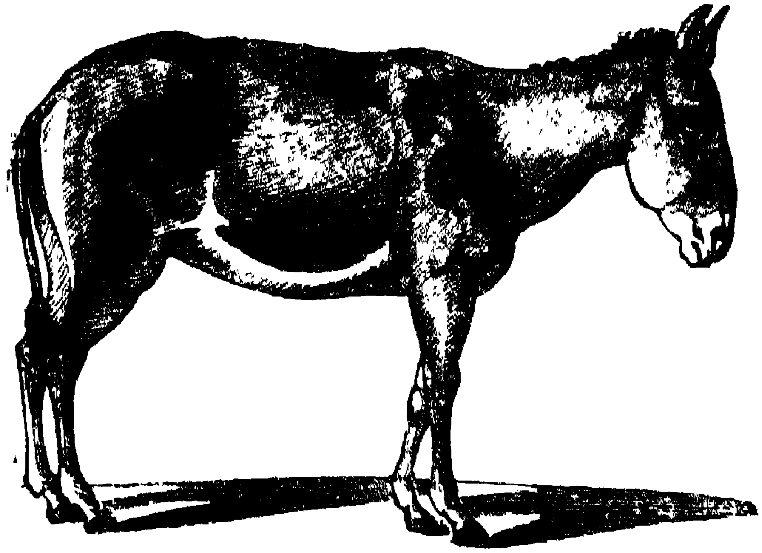
* Hunting the Wild Ass.—The sun was just rising over the summits of the eastern mountains, when my greyhound, Cooley, suddenly darted off in pursuit of an animal, which my Persians said, from the glimpse they had of it, was an antelope. I instantly put spurs to my horse, and, followed by Sedak Beg, and my provider, followed the chase. After an unrelaxed gallop of full three miles, we came up with the dog, who was within a short stretch of the creature we pursued; and, to my surprise—and, at first, vexation—I saw it to be an ass; but, on a moment's reflection, judging from its fleetness it must be a wild one—a species little known in Europe, but which the Persians prize above all other animals as an object of chase—I determined to approach to it as near as the very swift Arab I was on would carry me. But the single instant of checking my horse to consider, had given our game such a head of us, that, notwithstanding all our speed, we could not recover our ground on him. He then darted off again with the swiftness of thought, capering, kicking, and sporting in his flight, as if he were not blown in the least, and the chase were his pastime. He appeared to me to be about ten or twelve hands high; the skin smooth, like a deer's, and of a reddish colour, the belly and hinder parts partaking of a silvery grey; his neck was finer than that of a common ass, being longer, and bending like a stag's; and his legs beautifully slender. The head and ears seemed large, in proportion to the gracefulness of these forms; and by them I first cognised that the object of my chase was of the ass tribe. The mane was short and black, as was also a tuft which terminated his tail. No line whatever ran along his back, or crossed his shoulders, as is seen on the tame species with us. When my followers of the country came up, they regretted I had not shot the creature when he was so within my aim, telling me his flesh is one of the greatest delicacies in Persia; but it would not have been to eat him that I should have been glad to have had him in my possession. The prodigious swiftness and peculiar manner with which he fled across the plain, coincided exactly with the description that Xenophon gives of the same animals in Arabia—(vide Anabasis, lib. i.) But, above all, it reminded me of the striking portrait drawn by the author of the Book of Job. I shall venture to repeat it, since the words will give life and action to the sketch:—"Who hath loosed the bonds of the wild ass? whose house I have made the wilderness, and the barren land his dwelling? He scorneth the multitude of the city, neither regardeth he the crying of the driver. The range of the mountain is his pasture."—Sir R. K. Porter's Travels in Georgia.

(g) Ulloa, vol. i. p. 316.

THE ASS.



THE WILD ASS.

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by Indians on foot. When arrived at the proper places, they form a circle, in order to drive them into some valley—where, at full speed, they throw the noose, and endeavour to halter them. Those creatures, finding themselves inclosed, make very furious efforts to escape; and, if only one forces his way through, they all follow with an irresistible impetuosity. However, when noosed, the hunters throw them down, and secure them with fetters, and thus leave them till the chase is over. Then, in order to bring them away with greater facility, they pair them with tame beasts of the same kind; but this is not easily performed, for they are so remarkably fierce, that they often hurt the persons who undertake to manage them. They have all the swiftness of horses, and neither declivities nor precipices can retard their career. When attacked, they defend themselves with their heels and mouth with such activity, that, without slackening their pace, they often maim their pursuers. But the most remarkable property in these creatures is, that after carrying their first load, their celerity leaves them, their dangerous ferocity is lost, and they soon contract the stupid look and dullness peculiar to the assinine species. It is also observable, that these creatures will not permit a horse to live among them. They always feed together; and if a horse happens to stray into the place where they graze, they all fall upon him, and, without giving him the liberty of flying, they bite and kick him till they leave him dead upon the spot.*

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* **Wild Asses, &c.**—Wild Asses live in herds, each consisting of a chief and several mares and colts, sometimes to the number of twenty. They are excessively timid, and provident against danger. A male takes on him the care of the herd, and is always on the watch. If they observe a hunter, who, by creeping along the ground, has got near them, the sentinel takes a great circuit, and goes round and round him, as if discerning somewhat to be apprehended. As soon as the animal is satisfied, he rejoins the herd, which sets off with great precipitation. Sometimes his curiosity costs him his life; for he approaches so near as to give the hunter an opportunity of shooting him. The senses of hearing and smelling in these animals are most exquisite. "The wild asses did stand in the high places," says the prophet Jeremiah; "they snuffed up the wind like dragons." The Persians catch them and break them for the draught. When completely domesticated they are valuable, and sell at a high price, being at all times celebrated for their amazing swiftness.

Food.—The food of the wild asses is the saltest plants of the desert—such as the atriplex kali, and also the bitter musky tribe of herbs. They also prefer salt water to fresh. The hunters generally lie in wait for the asses near the ponds of brackish water, to which they resort to drink.

Asses in Perfection.—Asses are seen in their state of greatest perfection in the East. In Egypt and Arabia they are seen of great size and elegance; and in their attitudes and movements they exhibit a degree of gracefulness unknown even in those of Spain. Their step is light and sure, and their pace is brisk and easy. They are not only in common use for riding in Egypt, but the Mahometan merchants, the most opulent of the inhabitants, and even ladies of high rank, use them. In the principal streets of Cairo asses stand, ready bridled and saddled, for hire. The person who lets them accompanies his ass, running behind to goad him on. They are regularly rubbed down and washed, which render their coat smooth and glossy. Their food is the same as that of the horse, usually consisting of chopped straw, barley, and beans. They are here seen, says M. Denon, to enjoy the plenitude of their existence: they are healthy, active, cheerful, and the mildest and safest animals that a person can possibly have. Their natural pace is a canter or gallop, and without fatiguing the rider, the ass will carry him rapidly over the large plains which lie between the different parts of this straggling city.

Love of Music.—An ass at Chartres used to go to the chateau of Quarville, to hear the music that was often performed there. The owner of the chateau was a lady who had an excellent voice; and whenever she began to sing, the ass never failed to draw nearer the window, and listened very attentively. Once when a piece was performed, which no doubt pleased him better than any he had ever heard before, he left his ordinary post, walked without ceremony into the music-room, and in order to add to the concert, what he thought was alone wanting to render perfect, began to bray with all his might.

Patience.—There is much truth and humanity even in the sentimentalism of Sterne, when speaking on this animal. "'Tis an animal," he says, "I cannot bear to strike; there is a patient endurance of sufferings written so unaffectedly in his looks and carriage, which pleads so mightily for him, that it always disarms one; and to that degree, that I do not like to speak unkindly to him; on the contrary, meet him where I will, whe-

Such is this animal in its natural state—swift, fierce, and formidable; but, in his state of tameness, the ass presents a very different picture. The moment his native liberty is repressed, he seems entirely to give up all claims to freedom; and he assumes a patience and submission even humbler than his situation. He is, in a state of tameness, the most gentle and quiet of all animals. He suffers with constancy, and, perhaps, with courage, all the ill-treatment that cruelty and caprice are pleased to inflict. He is temperate with regard to the quantity and the quality of his provision. He is contented with the most neglected weeds, and makes his humble repast upon what the horse and other animals leave behind. If he gives the preference to any vegetable, it is to the plantain, for which he is often seen to neglect every other herb in the pasture; but he is chiefly delicate with respect to his water; he drinks only at the clearest brooks, and chiefly those to which he has been accustomed. He drinks as soberly as he eats, and never, like the horse, dips his nose into the stream. As he is seldom saddled, he frequently rolls himself upon the grass; and lies down for this purpose, as often as he has an opportunity, without minding what becomes of his burthen. He never rolls, like the horse, in the mud; he even fears to wet his feet, and turns out of his way to avoid the dirty parts of a road.

When very young, the ass is sprightly, and even tolerably handsome; but he soon loses these qualifications, either by age or bad treatment, and he becomes slow, stupid, and headstrong. He seems to show no ardour, except for the female, having been often known to die after the covering. The she-ass is not less fond of her young than the male is of her; and we are assured that she will cross fire and water to protect or rejoin it. This animal is sometimes not less attached to his owner, by whom he is too often abused. He scents him at a distance, and distinguishes him from others in a crowd; he knows the ways he has passed and the places where he inhabits.

When overloaded, the ass shows the injustice of his master, by hanging down his head and lowering his ears; when he is too hard pressed, he opens his mouth and draws back his lips in a very disagreeable manner. If his eyes are covered he will not stir a step; and if he is laid down in such a manner that one eye is covered with the grass, while the other is hidden with a stone, or whatever is next at hand, he will continue fixed in the same situation, and will not so much as attempt to rise to free himself from those slight impediments. He walks, trots, and gallops, like a horse; but although he sets out very freely at first, yet he is soon tired; and then no beating will make him mend his pace; it is in vain that his unmerciful rider exerts his whip or his cudgel; the poor little animal bears it all with patience, and without a groan; and, conscious of his own imbecility, does not offer even to move.

Notwithstanding the stupid heaviness of his air, he may be educated with as much ease as any other animal; and several have been brought up to perform, and exhibited as a show. In general, however, the poor animal is entirely neglected. Man despises this humble, useful creature, whose efforts are

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ther in town or country, in cart, or under panniers—whether in liberty or bondage, I have ever something civil to say to him; and surely never is my imagination so busy as in framing his responses from the etchings of his countenance."

Their Utility.—It appears, from actual experiment, these useful animals can be employed to advantage in drawing wagons and other carriages. The Earl of Egremont, in 1800, formed a team of six male asses, and during nine months he found them of great service. They brought one chaldron and a quarter of coals twice a day, in a wagon, from the canal to his lordship's house at Petworth, showing a degree of strength not expected from them. They were gentle and docile. During winter they had no oats, nor any other hay than the bands of the trusses consumed by horses, but lived on furze and holly. A Mr. Worthington worked a team of four asses at the plough, yoked two a-breast, driven in hand, with reins, by the ploughman, and found them masters of the labour required from two common farmer's horses of a slight kind. Mr. W. esteemed an acre a good day's work; but in cross ploughing they would do more; for such work two asses were sometimes adequate, and two were also sufficient in turning the furrow at potato-planting. The soil was a loamy stone brash, of middling, but varying depth, and tenacious rather than light.

Shaw.

exerted to please him, and whose services are too cheaply purchased. The horse is the only favourite, and upon him alone all expense and labour are bestowed. He is fed, attended, and stabled; while the ass is abandoned to the cruelty of the lowest rustics, or even to the sport of children; and, instead of gaining by the lessons he receives, is always a loser. He is conducted along by blows—he is insulted by unnecessary stripes—he is overloaded by the lazy; and, being generally the property of the poor, he shares with them in their wants and their distresses. Thus this faithful animal, which, were there no horses, would be the first of the quadruped kind in our esteem, is now considered as nothing; his properties and qualifications being found in a higher degree elsewhere, he is entirely disregarded; and, from being the second, he is degraded into one of the most useless of the domestic quadrupeds.[*]

For this reason, very little care has been taken to improve the breed; it is suffered to degenerate; and it is probable, that of all other animals this alone is rendered feebler and more diminutive, by being in a state of domestic servitude. The horse, the cow, and the sheep, are rendered larger by the assiduity of man; the ass is suffered to dwindle every generation, and particularly in England, where it is probable that, but for the medicinal qualities of its milk, the whole species would have ere now been extinguished. Nevertheless, we have good reasons to believe that, were the same care bestowed on the ass that is spent upon the horse—were the same industry used in crossing the breed and improving it—we should see the ass become, from his present mean state, a very portly and serviceable animal; we should find him rival the horse in some of his perfections, and exceed him in others. The ass, bulk for bulk, is stronger than the horse—is more sure-footed—and, though more slow in his motions, he is much less apt to start out of the way.

The Spaniards, of all people in Europe, seem alone to be acquainted with the value of the ass. They take all proper precautions to improve the breed; and I have seen a jack-ass from that country above fifteen hands high. This animal, however, seems originally a native of Arabia. A warm climate is known to produce the largest and the best; their size and spirit decline in proportion as they advance into colder regions.

Though now so common in all parts of England, the ass was entirely lost among us during the reign of Queen Elizabeth. Holingshed informs us that our land did yield no asses. (*g*) However, there are accounts of their being common in England before that time. In Sweden, they are at present a sort of rarity; nor does it appear by the last history of Norway that they have yet reached that country. It is in the hotter climates alone that we are to look for the original of this serviceable creature. In Guinea, they are larger and more beautiful than even the horses of the same country. In Persia, they have two kinds; one of which is used for burthens, being slow and heavy; the other, which is kept for the saddle, being smooth, stately, and nimble. They are managed as horses, only that the rider sits nearer the crupper, and they are taught to amble like them. They generally cleave their nostrils to give them more room for breathing, and many of these are sold for forty or fifty pounds.

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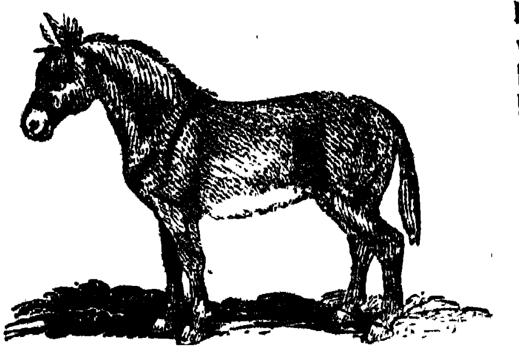
[*] Early History.—In early times, the ass was not, as is now the case with us, considered a despicable animal; for we find that he was rode by the rich and the noble, in preference to the horse. The following instances are recorded in the Sacred Writings: When Abraham went to offer his son Isaac, he rode upon an ass; Joseph's brethren rode on asses when they went down to Egypt to purchase corn; when Moses left Jethro, his father-in-law, he took his wife and his sons, and set them upon asses, and returned to Egypt. In the enumeration of Job's property, which appears to have been very great, we find that he had five hundred she asses; and in his prosperity he is said to have had a thousand. It is likely that the preference of females arose from the circumstance, that the ass can subsist on a coarse and scanty fare; so that in the patriarchal ages, the she ass would not only bear the rider through desert and barren tracks, but also with her milk contribute to the support of her master. In ancient times the ass was used for drawing chariots. Isaiah, predicting the fall of Babylon, describes the watchman as seeing "a chariot with a couple of horsemen, a chariot of asses, and a chariot of camels." The Indians had war-chariots drawn by wild asses, according to Herodotus. The Jews considered the ass as an unclean animal, because his hoof was not cloven, and he did not chew the cud; therefore refrained from eating his flesh, and offering him as a sacrifice. In cases of want, these laws were over-ruled; for when Samaria was besieged by the Syrians, "an ass's head was sold for four pieces of silver." The contempt of the Jews for this beast did not cease with her existence; for, unlike other animals, which, when they died, were buried under ground, he was thrown into the fields or ditches, to be eaten by wild beasts or birds. Such also was the burial of their criminals, or those they wished to treat with ignominy; Jehoiakim, king of Judah, was doomed to be thus treated—"He shall be buried with the burial of an ass, drawn and cast forth beyond the gates of Jerusalem."

(*g*) British Zoology, vol. i p. 11.

The ass is a much more hardy animal than the horse, and liable to fewer diseases. Of all animals covered with hair, he is the least subject to vermin, for he has no lice, probably owing to the dryness and the hardness of his skin. Like the horse, he is three or four years in coming to perfection; he lives till twenty or twenty-five; sleeps much less than the horse; and never lies down for that purpose, unless very much tired. The she-ass goes above eleven months with young, and never brings forth more than one at a time. The mule may be engendered either between a horse or a she-ass, or between a jack-ass and a mare.* The latter breed is every way preferable, being larger, stronger, and better shaped. It is not yet well known whether the animal called the Gimerro be one of these kinds; or, as is asserted, bred between the ass and the bull. While naturalists affirm the impossibility of this mixture, the natives of the Alpine countries, where this animal is bred, as strongly insist upon its reality. The common mule is very healthy, and will live above thirty years, being found very serviceable in carrying burthens, particularly in mountainous and stony places, where horses are not so sure-footed. The size and strength of our asses is at present greatly improved by the importation of Spanish jack-asses; and it is probable we may come in time to equal the Spaniards in breeding them, where it is not uncommon to give fifty or sixty guineas for a mule; and indeed, in some mountainous countries, the inhabitants cannot well do without them. Their manner of going down the precipices of the Alps, or the Andes, is very extraordinary; and with it we will conclude their history. In these passages, on one side, are steep eminences, and, on the other, frightful abysses; and, as they generally follow the direction of the mountain, the road, instead of lying in a level, forms at every little distance steep declivities, of several hundred yards downward. These can only be descended by mules; and the animal itself seems sensible of the danger, and the caution that is to be used in such descents. When they come to the edge of one of these descents, they stop without being checked by the rider; and, if he inadvertently attemps to spur



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* Mules Breeding.—Mules have not unfrequently been known to bring forth young, especially in hot countries; and instances have not been wanting, though they are rare, both in England and Scotland. But it would require a succession of experiments to prove that mules will breed with each other, and produce an offspring equally capable of continuing the race. The common mule is very healthy, and will live above thirty years. It is found very serviceable in carrying burdens, particularly in mountainous and stony places, where horses are not so sure footed. The size and strength of our breed have lately been much improved by the importation of Spanish male-asses; and it were much to be wished, that the useful qualities of this animal were more attended to; for, by proper care in its breaking, its natural obstinacy would, in a great measure, be corrected; and it might be formed with success for the saddle, the draught, or the burden. People of the first quality in Spain are drawn by mules, where fifty or sixty guineas is no uncommon price for one of them; nor is it surprising when we consider how far they excel the horse in a mountainous country, the mule being able to tread securely, where the former is incapable of standing.

them on, they continue immovable. They seem all this time ruminating on the danger that lies before them, and preparing themselves for the encounter They not only attentively view the road, but tremble and snort at the danger Having prepared for the descent, they place their fore-feet in a posture, as if they were stopping themselves; they then also put their hinder feet together, but a little forward, as if they were going to lie down. In this attitude, having taken as it were a survey of the road, they slide down with the swiftness of a meteor. In the mean time, all the rider has to do is to keep himself fast on the saddle without checking the rein, for the least motion is sufficient to disorder the equilibrium of the mule; in which case they both unavoidably perish. But their address in this rapid descent, is truly wonderful; for, in their swiftest motion, when they seem to have lost all government of themselves, they follow exactly the different windings of the road, as if they had previously settled in their minds the route they were to follow, and taken every precaution for their safety. In this journey, the natives, who are placed along the sides of the mountains, and hold by the roots of the trees, animate the beasts with shouts, and encourage them to perseverance. Some mules, after being long used to these journeys, acquire a kind of reputation for their safety and skill; and their value rises in proportion to their fame. (*g*)*

* EXTRAORDINARY INSTINCT.—Some animals, and dogs especially, have an extraordinary faculty of finding their way home. The following anecdote was related to me by Edward Hawke Locker, Esq., one of the governors of Greenwich Hospital, the circumstance having happened while he was on the Mediterranean. It is also mentioned in a note in Kirby and Spence's Entomology, who state that they had it from Lieutenant Alderson, of the Royal Engineers, who was personally acquainted with the facts.

In March, 1816, an ass, the property of Captain Dundas, R. N., then at Malta, was shipped on board the Ister frigate, Captain Forrest, bound from Gibralter for that island. The vessel having struck on some sands off the Point de Gat, at some distance from the shore, the ass was thrown overboard, to give it a chance of swimming to land—a poor one, for the sea was running so high that a boat which left the ship was lost. A few days afterwards, however, when the gates of Gibralter were opened in the morning, the ass presented himself for admission, and proceeded to the stable of a Mr. Weeks, a merchant, which he had formerly occupied, to the no small surprise of that gentleman, who imagined that from some accident, the animal had never been shipped on board the Ister. On the return of this vessel to repair, however, the mystery was explained; and it turned out that Valiante (so the ass was called) had not only swam safely to shore, but without guide, compass, or travelling map, had found his way from Point de Gat to Gibralter, a distance of more than 200 miles which he had never traversed before, through a mountainous and intricate country, intersected by streams, and in so short a period that he could not have made one false turn. His not having been stopped on the road, was attributed to the circumstance of his having been formerly used to whip criminals upon, which was indicated to the peasants, who have a superstitious horror of such asses, by the holes in his ears, to which the persons flogged were tied. — JESSE'S GLEANINGS IN NATURAL HISTORY.

(*g*) Ulloa, vol. i.

CHAP. IV.

THE ZEBRA.

There are but three animals of the horse kind.[*] The horse, which is the most stately and courageous; the ass, which is the most patient and humble; and the zebra, which is the most beautiful, but at the same time the wildest animal in nature. Nothing can exceed the delicate regularity of this creature's colour, or the lustrous smoothness of its skin; but, on the other hand, nothing can be more timid or more untamable.

It is chiefly a native of the southern parts of Africa; and there are whole herds of them often seen feeding in those extensive plains that lie towards the Cape

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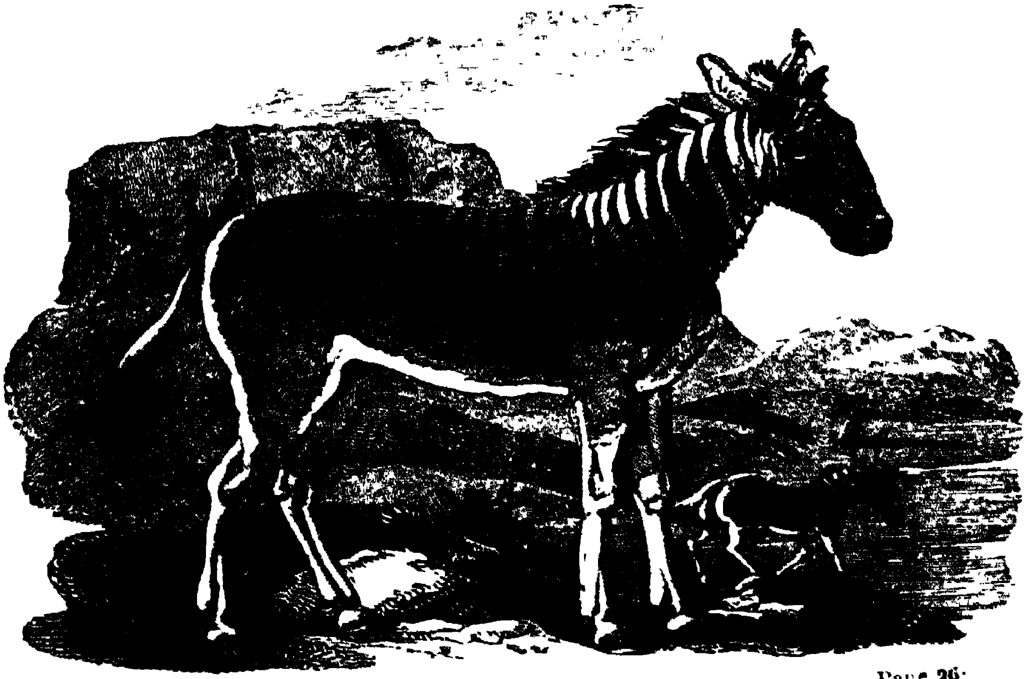
[*] Horse Genus.—The species of this genus are six, namely: the horse, the ass, common zebra, zebra of the plains, quagga, dziggtai, with the mule, which may be regarded as a sub-species.

Dziggtai.—The specific characters of the Dziggtai, are, his skin is a light bay in summer, of a redder hue in winter, the hair very long, and his tail terminated by a black tuft. He is generally the size of an ordinary wild horse; and he is most probably the wild mule of the ancients, and lives in troops in the sandy deserts of Central Asia. His air betrays extreme energy, being wild, fiery, and untameable in his disposition. The flesh of this animal is esteemed a great delicacy by the Moguls, Tungooses, and other hordes, on the borders of the Great Desert. Like the rest of the genus, he is gregarious, and is seen in troops of from twenty to thirty in number. They are considered by the natives untameable. Sonnini is of opinion, that this species will become extinct, from the circumstance of man not being able to subjugate them; and from their being such a favourite delicacy with the Asiatics.

Quagga.—The head and the neck of the quagga are dark-blackish brown. The head and neck striped with greyish white; the mane blackish and short; a longitudinal black band runs from the termination of the mane along the spine, and loses itself in the tail, which is like that of a cow, with a dark brown tuft of hair at its extremity. Quaggas associate in herds, frequently to the number of one hundred, in the most solitary regions of Southern Africa. Delalande observed great flocks of them, but they were never to be found in company with zebras, the species to which they are most nearly allied in general conformation. The cry of this animal bears a strong resemblance to the barking of a dog. He is very easily tamed, and rendered obedient to domestic purposes. Of late years they have been driven in pairs, in the curricles of the *haut-ton*, in Hyde Park, London. They are as obedient to the whip and reins as horses.

It is a matter of surprise that this animal has not long before been domesticated; his constitution is fitted for the hottest climate: he would be extremely valuable in those regions where the great heat destroys the capabilities of the horse. In a wild state the quagga is possessed of great natural courage. The natural pliability of his disposition, his great activity, and physical strength, peculiarly fit him for the service of man. The name of this animal in his native country, expresses the sound of his voice. A Scotch nobleman, the late Earl of Morton, succeeded in engendering mules between a male quagga and a mare. They were not handsome animals, however. Some time after this quagga died, the mare which had propagated with him produced a foal, three seasons after having the mule, which had the indistinct markings of the quagga, although she had not been with that animal from the time she had the hybrid foal to him.

Zebra of the Plains.—This animal was first ascertained by Mr. Burchell, to be different from the common or mountain zebra. The following is a specific description of the zebra of the plains, by Gray. "Body white, head with numerous narrow, brown stripes, which gradually unite together and form a bay nose; the neck and body with alternate broad stripes of black and narrow ones of brown, the latter of which nearly fill up the interstices between the black stripes, and only leave a narrow, white



THE QUAGGA. Page 26.

of Good Hope. However, their watchfulness is such, that they will suffer nothing to come near them; and their swiftness so great, that they readily leave every pursuer far bêhind. The zebra, in shape, rather resembles the mule, than the horse, or the ass. It is rather less than the former, and yet larger than the latter. Its ears are not so long as those of the ass, and yet not so small as in the horse kind. Like the ass, its head is large, its back straight, its legs finely placed, and its tail tufted at the end; like the horse, its skin is smooth and close, and its hind quarters round and fleshy. But its greatest beauty lies in the amazing regularity and elegance of its colours. In the male, they are white and brown; in the female white and black. These colours are disposed in alternate stripes over the whole body, and with such exactness and symmetry, that one would think Nature had employed the rule and compass to paint them. These stripes, which, like so many ribands, are laid all over its body, are narrow, parallel, and exactly separated from each other. It is not here as in other party-coloured animals, where the tints are blended into each other; every stripe here is perfectly distinct, and preserves its colour round the body, or the limb, without any diminution. In this manner are the head, the body, the thighs, the legs, and even the tail and the ears beautifully streaked, so that at a little distance one would be apt to suppose that the animal was dressed out by art, and not thus admirably adorned by nature.

In the male zebra, the head is striped with fine bands of black and white, which in a manner centre in the forehead. The ears are variegated with a white and dusky brown. The neck has broad stripes of the same dark brown running round it, leaving narrow white stripes between. The body is striped also across the back with broad bands, leaving narrower spaces of white between them, and ending in points at the sides of the belly, which is white, except a black line pectinated on each side, reaching from between the fore-legs, along the middle of the belly, two thirds of its length. There is a line of separation between the trunk of the body and the hinder quarters, on each side; behind which, on the rump, is a plat of narrow stripes, joined together, by a stripe down the middle, to the end of the tail. The colours are different in the female; and in none the stripes seem entirely to agree in form, but in all they are equally distinct; the hair equally smooth and fine; the white shining and unmixed; and the black, or brown, thick, and lustrous.

Such is the beauty of this creature, that it seems by nature fitted to satisfy the pride and the pleasure of man; and formed to be taken into his service. Hitherto, however, it appears to have disdained servitude, and neither force nor kindness have been able to wean it from its native independance and

margin. The belly, legs, and all quite white; the mane alternately banded with black and white." Thus this beautiful animal differs very materially from the common zebra.

The Dauw.—(*Equus Montanus*)—"This beautiful animal has hitherto been confounded by naturalists with the zebra. When these were first described by modern writers the Couagga or Quagga was considered to be the female zebra, while both that and the true zebra bore in common among the colonists the name of Quakka. The *Wild Paarde*, named Dauw by the Hottentots, and a much scarcer animal than the other two, was never suspected to be a different species, though it be far more distinct from the quakka and zebra, than these are from each other."

"The hoofs of animals destined by nature to inhabit rocky mountains, are, as far as I have observed, of a form very different from those intended for sandy plains; and this form is in itself sufficient to point out the Dauw as a separate species. The stripes of the skin will answer that purpose equally well, and show at the same time the great affinity and specific distinction of the *ass*, which may be characterized by a single stripe across the shoulders. The quakka has many similar marks on the head and fore part of the body: the zebra is covered with stripes over the head and the whole of the body, but the legs are white; and the wild paarde is striped over every part down to the feet. The zebra and wild paarde may be further distinguished from each other, by the stripes of the former being brown and white, and the brown stripe being double, that is, having a paler stripe within it; while the latter, which may be named *Equus Montanus*, is most regularly and beautifully covered with single black and white stripes: added to this, the former is never to be found on the mountains, nor the latter in the plains."—Burchell.

ferocity. But this wildness might, perhaps, in time, be surmounted; and, it is probable, the horse and the ass, when *first* taken from the forest, were equally obstinate, fierce, and unmanageable. Buffon informs us that the zebra, from which he took his description, could never be entirely mastered, notwithstanding all the efforts which were tried to tame it.

Yet still it is most probable that this animal, by time and assiduity, could be brought under subjection.* As it resembles the horse in form, without all doubt it has a similitude of nature, and only requires the efforts of an industrious and skilful nation to be added to the number of our domestics. It is not now known what were the pains and the dangers which were first undergone to reclaim the breed of horses from savage ferocity; these, no doubt, made an equal opposition; but, by being opposed, by an industrious and enterprising race of mankind, their spirit was at last subdued, and their freedom restrained. It is otherwise with regard to the zebra; it is the native of countries where the human inhabitants are but little raised above the quadruped. The natives of Angola, or Cafraria, have no other idea of advantage from horses but as they are good for food; neither the fine stature of the Arabian courser, nor the delicate colourings of the zebra, have any allurements to a race of people who only consider the quantity of flesh and not its conformation. The delicacy of the zebra's shape, or the painted elegance of its form, are no more regarded by such, than by the lion that makes it his prey. For this reason, therefore, the zebra may hitherto have continued wild, because it is the native of a country where there have been no successive efforts made to reclaim it. All pursuits that have been hitherto instituted against it, were rather against its life than its liberty; the animal has thus been long taught to consider man as its most mortal enemy; and it is not to be wondered that it refuses to yield obedience where it has so seldom experienced mercy. There is a kind of knowledge in all animals, that I have often considered with amazement; which is, that they seem perfectly to know their enemies, and to avoid them. Instinct, indeed, may teach the deer to fly from the lion; or the mouse to avoid the cat: but what is the principle that teaches the dog to attack the dog-butcher wherever he sees him? In China, where killing and dressing dogs is a trade, whenever one of these people moves out, all the dogs of the village, or the street, are sure to be after him. This I should hardly have believed, but that I have seen more than one instance of it among ourselves. I have seen a poor fellow who made a practice of stealing and killing dogs for their skins, pursued in full cry for three or four streets together, by all the bolder breed of dogs, while the weaker flew from his presence with affright. How these animals could thus find out their enemy, and pursue him, appears I own unaccountable, but such is the fact; and it not only obtains in dogs, but in several other animals, though perhaps to a less degree. This very probably may have been, in some measure, a cause that has hitherto kept the zebra in its state of natural wildness; and in which it may continue, till kinder treatment shall have reconciled it to its pursuers.

The Portuguese pretend that they have been able to tame them, and that they have sent four from Africa to Lisbon, which were so far brought under as to draw the king's coach; (*g*) they add, that the person who sent them over, had the office of notary conferred upon him for his reward, which was to remain to him and his posterity for ever: but I do not find this confirmed by any person who says he saw them. Of those which were sent to Brasil, not one could be tamed; they would permit one man only to approach them; they were tied up very short; and one of them, which had by some means got loose, actually killed his groom, having bitten him to death. (*g*) Notwithstanding this, I believe, were the zebra taken up very young, and properly treated, it must be rendered as tame as any other animal; and Merolla, who saw many of them, asserts, that when tamed, which he speaks of as being common enough, they are not less estimable for their swiftness than their beauty.

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* **The Zebra capable of being Reclaimed.**—Mr. Barrow also seems to think that the zebra might be tamed, notwithstanding its vicious and obstinate character, if proper means were resorted to. More skill, perseverance, and patience than the Dutch peasant possesses, are necessary to subdue an animal naturally haughty and courageous, or to tame one that is naturally timid. It is not by whips, nor goads, nor spurs, that a vicious animal in a state of nature is to be conquered. Wounds and ill-treatment only increase its resistance and obstinacy. In corroboration of this, Mr. F. Cuvier cites an instance of a female which was perfectly tame and gentle, and suffered herself to be mounted without difficulty.

(*g*) Dapper.

This animal, which is neither to be found in Europe, Asia, nor America, is nevertheless very easily fed. That which came over into England some years ago, would eat almost any thing, such as bread, meat, and tobacco; that which is now among us, subsists entirely upon hay. As it so nearly resembles the horse and the ass in structure, so it probably brings forth annually as they do. The noise they make is neither like that of a horse or an ass, but more resembling the confused barking of a mastiff dog. In the two which I saw, there was a circumstance that seems to have escaped naturalists; which is, that the skin hangs loose below the jaw upon the neck, in a kind of dewlap, which takes away much from the general beauty. But whether this be a natural or accidental blemish, I will not take upon me to determine.

These animals are often sent as presents to the princes of the east. We are told, that one of the governors of Batavia, gave a zebra, which had been sent to him from Africa, to the emperor of Japan, for which he received as an equivalent for the company a present, to the value of sixty thousand crowns. (*g*) Teller also relates that the Great Mogul gave two thousand ducats for one of them. And it is frequent with the African ambassadors to the court of Constantinople, to bring some of these animals with them, as presents for the Grand Seignor.*

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* EXPERIMENTS OF A CROSS BREED.—Three instances have occurred in Europe of female zebras producing mules. The first took place in this country. Lord Clive, on his return from India, brought with him a female zebra from the Cape. The experiment was first tried with an Arab horse, but failed. Asses were then tried but with no better effect. At last, by painting one of these asses like a zebra, the plan succeeded. The result was a foal, which resembled both father and mother. It had the form of the first, and the colour of the second, excepting that the tints were not so strongly marked. After his lordship's death, this mule was lost sight of, and its fate is unknown.

The second instance took place at Turin, between an ass and a female zebra, but the offspring did not survive.

The third instance took place in the Menagerie of Paris. From a female zebra and a Spanish ass of the largest size, proceeded a very well-formed mule. This animal proved a little larger than the mother, but as it grew up, had much of the form of the father. It was excessively docile.

The experiment was then repeated with a horse. Conception took place, but in the eighth month of gestation the zebra died. On opening the body, a male foetus was found, without hair, but having the head marked with black and white stripes.—GRIFFITH.

(*g*) Pyrard, tom. ii. p. 376.

(*g*) Navendorf.

CHAP. V.

RUMINATING ANIMALS.

Of all animals, those that chew the cud are the most harmless, and the most easily tamed. As they live entirely upon vegetables, it is neither their interest nor their pleasure to make war upon the rest of the brute creation; content with the pastures where they are placed, they seldom desire to change, while they are furnished with a proper supply; and fearing nothing from each other, they generally go in herds for their mutual security.

As the food of ruminant animals is entirely of the vegetable kind, and as this is very easily procured, so these animals seem naturally more indolent and less artful than those of the carniverous kind; and as their appetites are more simple, their instincts seem to be less capable of variation. The fox or the wolf are for ever prowling—their long habits of want give them a degree of sharpness and cunning—their life is a continued scene of stratagem and escape; but the patient ox, or the deer, enjoy the repast that Nature has abundantly provided: certain of subsistence, and content with security.

As Nature has furnished these animals with an appetite for such coarse and simple nutriment, so she has enlarged the capacity of the intestines to take in a greater supply. In the carniverous kinds, as their food is nourishing and juicy, their stomachs are but small, and their intestines short; but in these, whose pasture is coarse, and where much must be accumulated before any quantity of nourishment can be obtained, their stomachs are large and numerous, and their intestines long and muscular. The bowels of a ruminating animal may be considered as an elaboratory, with vessels in it, fitted for various transmutations. It requires a long and tedious process before grass can be transmuted into flesh; and for this purpose, Nature, in general, has furnished such animals as feed upon grass with four stomachs, through which the food successively passes, and undergoes the proper separations.*

But Nature has not been less careful in another respect—in fitting the intestines of these animals for their food. In the carniverous kinds they are thin and lean; but in ruminating animals they are strong, fleshy, and well covered with fat. Every precaution seems taken that can help their digestion: their stomach is strong and muscular, the more readily to act upon its contents; their intestines are lined with fat, the better to preserve their warmth; and they are extended to a much greater length, so as to extract every part of that nourishment which their vegetable food so scantily supplies.

In this manner are all quadrupeds of the cow, the sheep, or the deer kind, seen to ruminate—being thus furnished with four stomachs, for the macerating of their food. These, therefore, may most properly be called the *ruminant kinds;* although there are many others that have this quality in a less observable degree. The rhinoceros, the camel, the horse, the rabbit, the marmotte, and the squirrel, all chew the cud by intervals, although they are not furnished with stomachs like the former. But not these alone, there are numberless other animals that appear to ruminate—not only birds, but fishes and insects. Among birds are the pelican, the stork, the heron, the pigeon, and the turtle: these have a power of disgorging their food to feed their young. Among fishes are lobsters, crabs, and that fish called the dorado. The salmon also is said to be of this number; and if we may believe Ovid, the *scarus* likewise, of which he says, (*g*)

> Of all the fish that graze beneath the flood,
> He only ruminates his former food.

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* All quadrupeds that chew the cud have suet, instead of soft fat of other animals; and they have the awkward habit of rising, when in a recumbent position, upon their hind legs first. A cow, when she rises from the ground, places herself on the fore knees, and then lifts up the whole hinder parts. A horse springs up first on his fore legs, and then rises up his hinder parts. This may be owing to the different conformation of the stomach.

(*g*) At contra herbosa pisces laxantar arena,
Ut scarus, epastas *solus* qui ruminant escas.

COWS—(Various breeds.)

THE OX.

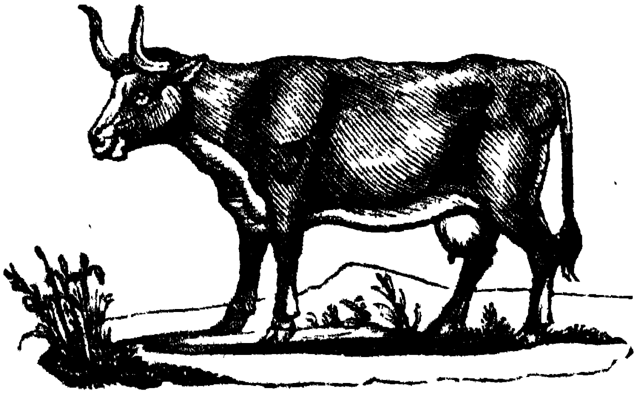
Of insects, the ruminating tribe is still larger: the mole, the cricket, the wasp, the drone, the bee, the grasshopper, and the beetle. All these animals either actually chew the cud, or seem at least to ruminate. They have the stomach composed of muscular fibres, by means whereof the food is ground up and down, in the same manner as in those which are particularly distinguished by the appellation of ruminants.

But not these alone; men themselves have been often known to ruminate, and some even with pleasure. The accounts of these calamities, for such I must consider them, incident to our fellow-creatures, are not very pleasant to read; yet I must transcribe a short one, as given us by Slare, in the Philosophical Transactions, as it may in some measure show the satisfaction which the lower tribes of animals enjoy while they ruminate. The man in question was a citizen of Bristol, of about twenty years of age, and, what seemed more extraordinary still, of a ruminating family, for his father was frequently subject to the same infirmity—or amusement, as he himself perhaps would call it. This young man usually began to chew his meat over again within about a quarter of an hour after eating. His ruminating after a full meal generally lasted about an hour and a half; nor could he sleep until this task was performed. The victuals, upon the return, tasted even more pleasantly than at first; and returned as if they had been beaten up in a mortar. If he ate a variety of things, that which he ate first came up again first; and if this return was interrupted for any time, it produced sickness and disorder, and he was never well till it returned. Instances of this kind, however, are rare and accidental; and it is happy for mankind that they are so. Of all other animals, we spend the least time in eating; this is one of the great distinctions between us and the brute creation; and eating is a pleasure of so low a kind, that none but such as are nearly allied to the quadruped desire its prolongation.

CHAP. VI.

OF QUADRUPEDS OF THE COW KIND.*

Of all ruminant animals, those of the Cow kind deserve the first rank, both for their size, their beauty, and their services. The horse is more properly an animal belonging to the rich; the sheep chiefly thrives in a flock, and requires attendance; but the cow is more especially the poor man's pride, his riches, and his support. The climate and pasture of Great Britain is excellently adapted to this animal's moderate nature; and the verdure and the fertility of our plains are perfectly suited to the manner of its feeding; for wanting the upper fore teeth, it loves to graze in a high, rich pasture. Our pastures supply them with abundance, and they in return enrich the pasture; for, of all animals, the cow seems to give back more than it takes from the soil. The horse and the sheep are known, in course of years, to impoverish the ground: the land where they have fed becomes weedy, and the vegetables coarse and unpalatable; on the contrary, the pasture where the cow has been bred acquires a finer, softer surface, and becomes



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* The animals of this kind have the horns hollow, smooth, turned outwards and forwards, in a semi-circular form; in the lower jaw there are eight front teeth, but non in the upper, and there are no tusks in either.

every year more beautiful and even. The reason is, that the horse being furnished with fore teeth in the upper jaw, nips the grass closely; and, therefore, only chooses that which is the most delicate and tender; the sheep also, though with respect to its teeth, formed like the cow, only bites the most succulent parts of the herbage. These animals, therefore, leave all the high weeds standing; and while they cut the finer grass too closely, suffer the ranker herbage to vegetate and overrun the pasture. But it is otherwise with the cow; as its teeth cannot come so close to the ground as those of the horse, nor so readily as those of the sheep, which are less, it is obliged to feed upon the tallest vegetables that offer: thus it eats them all down, and, in time levels the surface of the pasture.

As we have indisputably the best breed of horned cattle of any in Europe, so it was not without the same assiduity that we came to excel in these, as in our horses. The breed of cows has been entirely improved by a foreign mixture, properly adapted to supply the imperfections of our own. Such as are purely British, are far inferior in size to those on many parts of the continent; but those which we have thus improved, by far excel all others. Our Lincolnshire kind derive their size from the Holstein breed; and the large, hornless cattle that are bred in some parts of England came originally from Poland.* We

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* Urus, or Wild Ox of Lithuania.—(Bos Urus.)—Dr. Von Jorocki read to the Zoological section of the Meeting of Naturalists at Hamburgh, in September, 1830, a communication on the Urus, or Wild Ox of Lithuania (*Bos Urus*, Gm.) A remnant of these animals, which appear to have at one period existed in many parts of Europe, is still preserved in a wild state in the forest of Bialowiza, in Poland, under the special protection of the Russian Emperor, in which situation the author, who is professor of Zoology in the University of Warsaw, has had opportunities of observing them, and of collecting various facts respecting their habits and mode of life, of which we give the following:—

The wild oxen of the forest of Bialowiza live in herds, except a few of the older ones, which wander about singly. Though they have never been tamed, they are not so shy but that they may be approached within a moderate distance, when care is taken to advance towards them from the windward side. Each herd keeps constantly to the same district of forest, near to some river or stream, so that each of the twelve foresters, who have charge of the wood, knows the herds that belong to his district. The number of oxen in every herd is ascertained in the beginning of winter, by observing their feet-tracts on the new-fallen snow, as they pass between the wood and the store of hay, which forms their winter provender. The whole number, as thus estimated, is at present about 711, of which 48 are calves of last year. The cows scarcely bring forth above once in three years; the calves are produced in May, and are suckled nearly a whole year; they continue to grow for six years, and may live till forty. The urus feeds on various grasses, and on the leaves and bark of young trees and brushwood—especially the willow, poplar, ash, and birch. In autumn they also browse on heath, and the lichens which cover the bark of trees. The rutting season commences in August, and lasts a fortnight, about which time they are fat and sleek, and unusually sportive. Their most common sport consists in thrusting their horns into the ground, near a young tree, and ploughing round it till they root it up. It is from this circumstance, in the author's opinion, that the horns are almost always more or less torn, or otherwise injured at the points. Horses and domestic cattle scent the urus afar off, and immediately give signs of dread and aversion.

Dr. Von Jorocki coincides with the most eminent zoologists of the present day, in considering the urus a distinct species from the common ox. He has given the distinctive characters at some length, but they do not materially differ from those assigned by other naturalists. The name of the animal in the Polish language is Zubr, pronounced Suber, but in some districts it is also called Tur, which circumstance appears to have so far misled the Baron Von Heberstein, who visited Poland in the 16th century, that he described two animals in place of one, to correspond to these two different names, and thus caused no small embarrassment to later writers. The German name of the animal is Auerochs. According to Gesner and Cuvier, it is the same as the Bonasus of Aristotle, which animal was an inhabitant of Paeonia, or that part of ancient Macedonia now called Bulgaria, which is still the native country of the Aurochs. Writers posterior to the time of Aristotle mention two sorts of wild oxen, under the names of the Urus and the Bison, the latter being distinguished by its mane, the urus by the great size of its horns. It is not improbable that the Bison mentioned by Seneca and Pliny was the Bonasus of Aristotle, and were once famous for a wild breed of these animals; but these have long since been worn out; and, perhaps, no kingdom in Europe can furnish so few wild animals of all kinds as our own.* Cultivation and agriculture are sure to banish these, wherever they are found; and every addition a country receives from art, drives away those animals that are only fitted for a state of nature.†

Of all quadrupeds, the cow seems most liable to alteration from its pasture.

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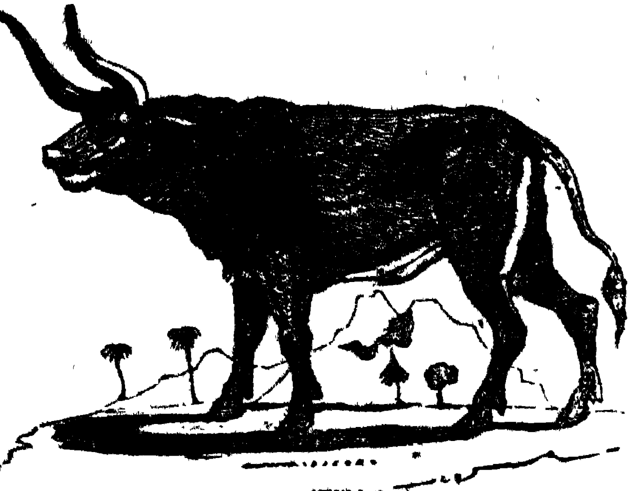
the Zubr and Anerochs of the moderns, while the Urus of these writers seems to be now extinct as a wild animal, but was perhaps the original of our present domestic cattle.* Fossil bones are found nearly resembling those of the common ox, which Cuvier conceives may have belonged to animals of the original race; and it is worthy of remark, that the word *Ur* signifies a bull in the present dialect of several of the Swiss cantons.

* Bojanus, however, is of a different opinion. (*De uro nostrate, &c.* Nova Acta Acad. Nat. Cur. xiii. 411.)

* THE WHITE URUS.—The *Urus Scoticus* is a wild breed of the Ox, the probable remains of the genuine Urus. It is of small size, and ranged formerly through the woods of southern Scotland and the north of England. When this breed was exterminated from the open forests is unknown; but some time before the Reformation, the remnants were already confined in parks belonging to ecclesiastical establishments, from whence they were transferred at the dissolution to that of Drumlanrig, and other places. Those in the park of Burton Constable were all destroyed in the middle of the last century, by a distemper. The race is entirely of a white colour; the muzzle invariably black; the inside of the ear, and about one-third part of the outside, from the tip downwards, red; the horns are white, with black tips of a fine texture, and, as in the fossil skull, bent downwards. Bulls weigh from thirty-five to forty-five stone; and cows, from twenty-five to thirty-five. Before they were kept in parks, they were probably larger and more rugged; old bulls still acquire a kind of mane about two inches long, and their throat and breast is covered with a coarser hair. Those at Burton Constable differed from the others, they having the ears and tips of their tail black. Their manner differ from domestic oxen, and may be in part those of the ancient *urus*. Upon perceiving a stranger, they gallop wildly in a circle round him, and stop to gaze, tossing their heads, and showing signs of defiance; they then set off, and gallop a second time round, but in a contracted circle, repeating this circular mode of approaching, till they are so near that it becomes prudent to retire from their intended charge. The cows conceal their young calves for eight or ten days, going to suckle them twice or three times in a day; if a person come near the calf, it conceals itself by crouching. One, not more than two days old being discovered by Dr. Fuller, was very lean and weak. On his stroking its head it got up, pawed the ground, bellowed very loud, went back a few steps, and bolted at his legs; it then began to paw again, and made another bolt, but missing its aim, fell, and was so weak as not to be able to rise; but by this time, its bellowing roused the herd, which came instantly to its relief, and made the doctor retire. When one of this breed happens to be wounded, or is enfeebled by age or sickness, the others set upon it, and gore it to death.



(Wild Ox.)

These animals were killed to within a few years, by a grand assemblage of horsemen and country people, armed with muskets: the former rode one from the herd, and the latter took their stations on walls or in trees. There was grandeur in the chase; but, from the number of accidents which occured, it was laid aside. We believe that at present none remain, excepting at Chillingham Castle, Northumberland, and Hamilton Palace Park, in Scotland, with one or two places beside.

† WILD BULLS.—In the province of San Martin, in South America, M. Roulin saw wild bulls feeding in the *llanos* among domestic cattle. These animals pass their morning in the woods which cover the foot of the Cordillera, and come out only about two in the afternoon, to feed in the savanna. The moment they perceive a man, they gallop off to the woods.

In the different parts of our own country, we easily perceive the great varieties produced among these animals, by the richness or poverty of the soil. In some they grow to a great bulk; and I have seen an ox sixteen hands high, which is taller than the general run of our horses. In others, they appear as diminutive, being not so large as an ass. The breed of the Isle of Man, and most parts of Scotland, is much less in general than in England or Ireland: they are differently shaped also, the dewlap being much smaller, and, as the expression is, the beast has more of the ewe neck. This, till some years ago, was considered in cattle as a deformity; and the cow was chosen, according to Virgil's direction, with a large dewlap: however, at present it is the universal opinion, that the cow wants in udder what it has in neck, and the larger the dewlap, the smaller is the quantity of its milk. Our graziers now, therefore, endeavour to mix the two breeds; the large Holstein with the small northern; and from both results that fine milch breed, which excels the cattle of any other part of the world.

This difference, arising from pasture, is more observable in other countries than in our own. The cow kind is to be found in almost every part of the world, large in proportion to the richness of the pasture; and small, as the animal is stinted in its food. Thus Africa is remarkable for the largest and the smallest cattle of this kind; as is also India, Poland, Switzerland, and several other parts of Europe. Among the Eluth Tartars, where the pastures are remarkably rich and nourishing, the cow becomes so large, that he must be a tall man who can reach the tip of its shoulder.[*] On the contrary, in France, where the

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[*] Various Species.—The breeds of the Kisguise and Calmuck Tartars, those of Podolia and the Ukraine, of European Turkey, of Hungary, and of the Roman states, are among the largest known. They are nearly all distinguishable by ample horns spreading sideways.

Italy.—That in the Papal dominions is not found represented on the ancient bas-reliefs of Rome, but was introduced most probably by the Goths, or at the same time with the buffalo. Italy possesses another race, presumed to have existed in Pagan times, valued for its fine form and white colour. Tuscany produces this race, and droves of them were transplanted to Cuba, and imported into Jamaica.

Egypt.—Ancient Egypt nourished a large white breed, which, however, is not the most common upon the monuments of that country, where the cattle are usually represented with large irregular marks of black or brown upon a white ground.

Abyssinia.—In this country there is also a large white breed, but the greater number are variously coloured.

Cape of Good Hope.—The Hottentots and Caffres rear a fine race, likewise marked with large brown or black clouds: some are of extraordinary size, with the horns directed forward and upwards. It is from these that their war oxen are chosen; they ride them on all occasions, being quick, persevering, extremely docile, and governed by the voice or a whistle of the owners with surprising intelligence. They thrive most in saline pastures, and the kind of food which they procure in these, may cause the peculiarly fetid smell of their breath, noticed by Mr. Barrow. The long horns of some of this breed, are twisted into spiral curves, said to be affected by a hot iron.

Denmark.—In this country a breed of large stature is reared, which most likely produced the tall Dutch race, "of which we have seen one," says Mr. Griffith, "weighing a thousand pounds;" from this race sprang the Holstein, which was the parent of the old unimproved English breeds; the Vandals or Goths may have conducted it into

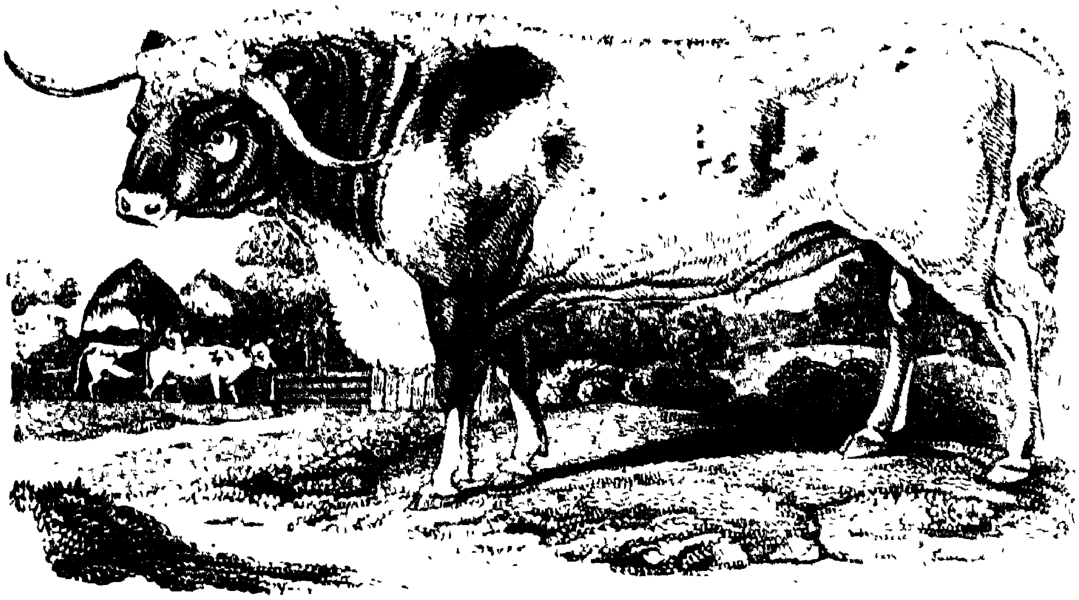
Spain, and left its traces in the large breeds of Salamanca, and transported from thence to South America, furnished the root of the fine races which cover the Pampas, near Buenos Ayres, and in Cuba; while the large English supplied that of the United States.

Breeds with small and middle sized horns exist in the Crimea, in a great part of Germany, Sweden, France, England, &c.; and the polled races, or hornless cattle, originally as it would appear, a German breed, according to the passage from Tacitus, "*Ne armentis quidem honor aut gloria frontis*," have spread to Iceland and Norway, where they are often fed on dried fish.

The following, derived from the several before noted races, is a brief account of the principal British Breeds:—

1. *The Long-horned or Lancaster breed*, distinguished by long horns and thick, firm hides; long, close hair; large hoofs, and depth of the fore quarter, gives in proportion, less milk but more cream. They are of various colours, but in general with a white streak along the spine, and a white spot inside of the houghs.

BULLS—*Fighting.*



LANCASHIRE BULL.

animal is stinted in its food, and driven from the most flourishing pastures, it greatly degenerates.

But the differences in the size of this animal are not so remarkable as those which are found in its form, its hair, and its horns. The difference is so very extraordinary in many of them, that they have been even considered as a different kind of creature, and names have been given them as a distinct species, when in reality they are all the same. (*g*) In this manner the urus and the bison have been considered, from the variety in their make, to be distinct in their production; but they are all in fact the descendants of one common stock, as they have that certain mark of unity, they breed and propagate among each other Naturalists have therefore laboured under an obvious error, when, because of the extreme bulk of the urus, or because of the hump upon the back of the bison, they assigned them different places in the creation, and separated a class of animals which was really united. It is true, the horse and the ass do not differ so much in form, as the cow and the bison; nevertheless, the former are distinct animals, as their breed is marked with sterility; the latter are animals of the same kind, as their breed is fruitful, and a race of animals is produced. in which the hump belonging to the bison is soon worn away. The differences, therefore, between the cow, the urus and the bison, are merely accidental. The same caprice in nature that has given horns to some cows, and denied them to others, may also have given the bison a hump, or increased the bulk of the urus; it may have given the one a mane, or denied a sufficiency of hair to the other.

But before we proceed farther, it may be proper to describe these varieties, which have been thus taken for distinct kinds. (*g*) The urus, or wild bull, is chiefly to be met with in the province of Lithuania; and grows to a size, that scarce any other animal, except the elephant, is found to equal. It is quite black; except a stripe mixed with white, that runs from the neck to the tail, along the top of the back; the horns are short, thick, and strong; the eyes are fierce and fiery; the forehead is adorned with a kind of garland of black curled hair, and some of them are found to have beards of the same; the neck is short and strong, and the skin has an odour of musk. The female, though not so big as the male, exceeds the largest of our bulls in size; nevertheless, her udder

2. *The short-horned*, sometimes called the Dutch, includes the varieties named the *Holderness, Teeswater, Yorkshire, Durham, and Northumberland.* This has been the most improved, produces milk, usually twenty-four quarts per day, and butter to three firkins per season.

3. *The Middle-horned*, comprehending the *Devon, Hereford, and Sussex*, most esteemed for draught, active, and hardy, do not milk so well as the former, but fatten early.

4. The *Polled* breeds, of which the most esteemed is the Galloway, straight in the back, well moulded, with soft hair; not large. They travel well, and reach the London markets without deterioration. The *Suffolk Duns* are a variety of this breed, introduced from Scotland and crossed.

5. The *Highland* race consists of several varieties, of which the West Highland, Argyleshire, or Skye, form the most valuable; of these the *Kylse* from the Hebrides, so named, because in their progress to the south, they cross the Kylses or ferries in the mainland and Western Islands. The bulls are of middle size, of a black, dark brown, or reddish brown colour, without white; head small; muzzle fine, and horns rather slender. The other variety is the *Norlands*, their hides are coarse, the make narrow and long legged. The *Orkney* or *Shetland* are of a diminutive size; an ox weighing about sixty pounds a quarter, and a cow forty. They are of all colours, and their shapes generally bad; but they give excellent milk, and fatten rapidly.

6. The *Fifeshire*, which is an improved breed of the Highland, crossed with the Cambridgeshire. The Aberdeenshire are a variety of them.

7. The *Welsh* have two breeds; one large, dark brown, with some white, denoting a cross from the long horned; the second is lower, well formed, black, with little white, and good milkers.

8. The *Alderney*, or more properly, Guernsey, is small, mostly yellow, or light red, with white about the face and limbs; they have crumpled horns, and till lately, ill shaped. They give excellent milk and fine beef.

(*g*) Buffon, vol. xxiii. p. 78.

(*g*) This description is chiefly taken from Klein.

and teats are so small, that they can scarcely be perceived. Upon the whole, however, this animal resembles the tame one very exactly, except in some trifling varieties, which his state of wildness, or the richness of the pastures where he is found, may easily have produced.

(Bison.)

The bison, which is another variety of the cow kind, differs from the rest, in having a lump between its shoulders. These animals are of various kinds; some very large, others as diminutively little. In general, to regard this animal's fore parts, he has somewhat the look of a lion, with a long shaggy mane, and a beard under his chin; his head is little, his eyes red and fiery, with a furious look; the forehead is large, and the horns so big, and so far asunder, that three men might often sit between them. On the middle of the back there grows a bunch almost as high as that of a camel, covered with hair, and which is considered as a great delicacy by those that hunt him. There is no pursuing him with safety, except in forests where there are trees large enough to hide the hunters. He is generally taken by pit-falls; the inhabitants of those countries where he is found wild, digging holes in the ground, and covering them over with boughs of trees and grass; then provoking the bison to pursue them, they get on the opposite side of the pit-fall, while the furious animal, running head foremost, falls into the pit prepared for him, and is there quickly overcome and slain.

Besides these real distinctions in the cow kind, there have been many others made, that appear to be in name only. Thus the bonasus, of which naturalists have given us long descriptions, is supposed by Klein and Buffon to be no more than another name for the bison, as the descriptions given of them by the ancients coincide. Of all the varieties of the cow kind, there are in fact but two that are really distinct; namely the cow, and the buffalo: these two are separated by nature; they seem to bear an antipathy to each other; they avoid each other, and may be considered as much removed as the horse is from the ass or the zebra.

If we examine the form of these animals, as they are found tame, in different regions, we shall find, that the breed of the urus, or those without a hump, chiefly occupy the cold and the temperate zones, and are not so much dispersed, towards the south. On the contrary, the breed of the bison, or the animal with a hump, is found in all the southern parts of the world; throughout the vast continent of India; throughout Africa, from Mount Atlas to the Cape of Good Hope.[*] In all these countries, the bison seems chiefly to prevail; where they

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[*] The Bison.—Among the Bisons are found indications of an ancient and colossal species existing at one time in Europe and Northern Asia, and also in America, attested by the repeated discovery of enormous skulls in the diluvian strata of the earth, on the vegetable mould, and even beneath them, among the remains of the mastadon and rhinoceros.

The animal commonly known by the name of Anerocks and Zubr, is the true bison of the ancients. It is distinguished by an elevated stature, measuring six feet at the shoulder, and ten feet three inches from the nose to the tail. Mr. Gillibert, who resided a long time in Poland, and reared a female, is the author who dissected and best described this species. It was known to the ancients, and their bones, as was observed just now, are often found in the superfluous strata of temare found to have a smooth, soft hair, are very nimble of foot, and in some measure supply the want of horses.* The bison breed is also more expert and

perate Europe. At present they are nearly destroyed in Lithuania, though they were still common in Germany, in the eighth century. They may be now looked upon as residing only in the forests of Southern Russia, in Asia, the Carpathian and Caucasian mountain forests, and the Kobi Desert. They prefer high wooded localities to the plain or low lands, live in small troops, and have a groaning voice. The Gaw-Kottah of the Persians is probably this animal.

THE GAUR.—This is a species of bison, which, from all accounts, appears to be among the largest now living; and although in Indian phraseology the word buffalo has been used, no doubt can exist respecting its affinity to the bison; indeed the gaur may be no other than the true bison, though from certain testimonies we are inclined to regard it as an intermediate species The head of the gaur exhibits all the characteristics of the domestic ox, but the forehead is more arched and raised; the horns strong and rough, are not bent back as in the buffalo; the eyes are smaller than the ox; the muscles of the legs and thighs very prominent and strong. But the most remarkable character of the gaur, that which should distinguish it from all other ruminants, consists in a series of spinous processes along the back, beginning at the last vertebra of the neck, shortening gradually till they are lost half way down the spine; the foremost are at least six inches higher than the ridge of the back. These gaurs live in families of ten or tweny, graze on the meadows, and feed on leaves and buds of trees. Buffaloes fear their presence and never invade their localities.

THE AMERICAN BISON.—This species is commonly known by the name of buffalo, and was long compounded with the bison of Europe, though it is anatomically more remote from it than the yak, notwithstanding the great external similarity between them. They are distinguished by small horns, very distant, turned sideways and upwards. The structure of the animal is heavy in front, meagre and weak behind. Upon the summit of the head there is a vast quantity of long, wooly hair hanging over the face, ears, and horns.

These animals are in the habit of standing with the feet much more under them than domestic cattle. They reside in winter as much as possible in the woods of temperate North America, ascending the mountains and penetrating into New Mexico. Towards summer they migrate northwards, and in their passage both in spring and autumn, occasionally form herds of several thousands. They are not naturally dangerous, but irritable. They defend themselves against troops of wolves by forming a circle with the strongest outside, a practice which is common to most gregarious ruminants of the northern hemisphere.

The Indians shoot them or encompass a herd by firing the grass, when a number are destroyed without difficulty. In the north, they drive them into staked avenues, while the snow is on the ground, and kill them from a tree in the centre of the recess; they make cloaks of their hides. The buffalo dance is one of the principal ceremonies of the year among the many tribes.

THE YAK.—This animal bears some resemblance to the buffalo in the form of the head. Like the rest of the *bisontes*, the yaks frequent mountainous woods and valleys, keeping the south side in winter and the north in summer. They are found in Thibet, China, and central India. It also inhabits the Ataic mountains, and supplies milk to the Calmucks, and affords materials of trade in the sale of their white tails, of which the Persians and Turks make standards, commonly named horse-tails, dyed of various colours, but principally crimson. The Tartars lead a wandering life with these cattle, preserving their milk which is very good and abundant, in bladders; till they load the animals with their own produce, and carry it to market; they make tents and ropes of the hair; caps and clothes of the skin.

THE GAGAL is another of the existing species, which is nearly the size and shape of an English bull, with a dull and heavy appearance; but at the same time, of a form equal in strength and activity with the wild buffalo. It would be tedious to recite its peculiarities; suffice it, in the place of the hump, the gagal has a sharp ridge which commences on the hinder part of the neck, slopes gradually up till it comes over the shoulder joints, then runs horizontally almost a third part of the back, where it terminates with a very sudden slope. The people inhabiting the hills to the eastward of Chitagong have herds of the gagal, in a domestic state.—ANIMAL KINGDOM OF BARON CUVIER.

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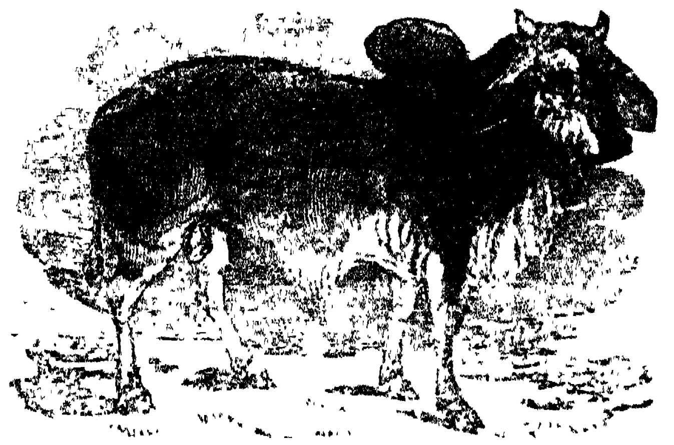
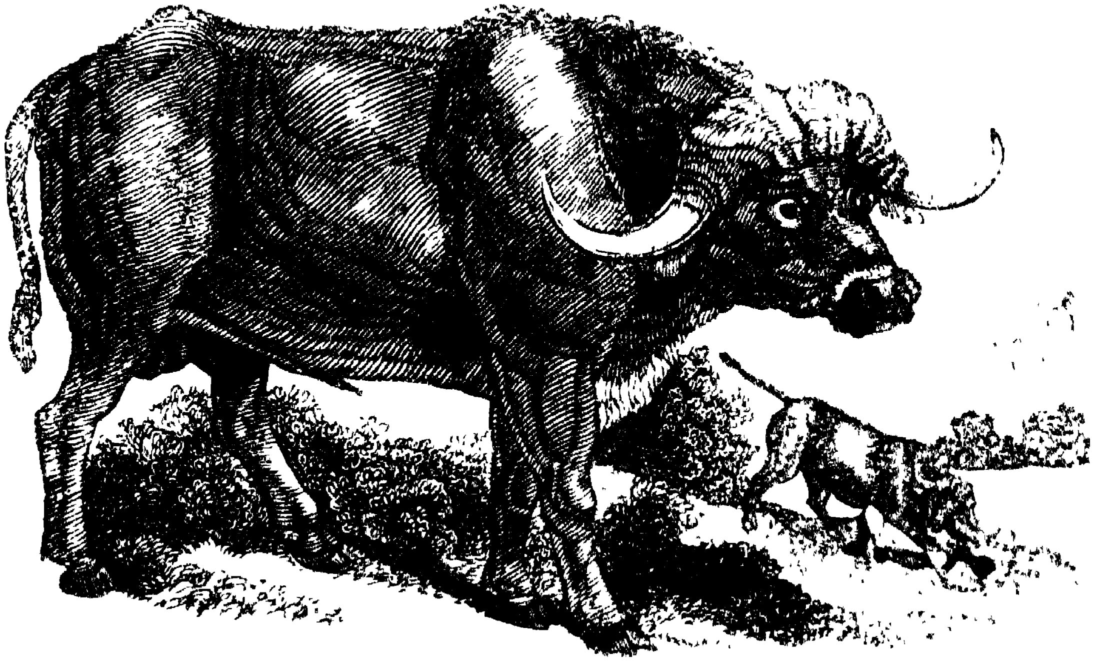
* BISONS IN LITHUANIA. — The Bison, called in Polish Zuby, has disappeared from Europe, with the exception of the forest of Bialowiez, in Luthuania, wherein, as appears from an official return which has just been published, there were, in 1824, 543 large and small. The Russian Government has taken measures for the preservation of this valuable race of animals.

docile than ours; many of them, when they carry burthens, bend their knees to take them up, or set them down: they are treated, therefore, by the natives of those countries, with a degree of tenderness and care equal to their utility; and the respect for them in India has degenerated even into blind adoration. But it is among the Hottentots where these animals are chiefly esteemed, as being more than commonly serviceable. They are their fellow-domestics, the companions of their pleasures and fatigues; the cow is at once the Hottentot's protector and servant, assists him in attending his flocks, and guarding them against every invader; while the sheep are grazing, the faithful bakely, as this kind of cow is called, stands or grazes beside them; still, however, attentive to the looks of its master, the bakely flies round the field, herds in the sheep at their straying, obliges them to keep within proper limits, and shows no mercy to robbers, or even strangers, who attempt to plunder. But it is not the plunderers of the flock alone, but even the enemies of the nation, that these bakelys are taught to combat. Every army of Hottentots is furnished with a proper herd of these, which are let loose against the enemy, when the occasion is most convenient. Being thus sent forward, they overturn all before them: they strike every opposer down with their horns, and trample upon them with their feet: and thus often procure their masters an easy victory, even before they have attempted to strike a blow. An animal so serviceable, it may be supposed, is not without its reward. The bakely lives in the same cottage with its master, and, by long habit, gains an affection for him; and in proportion as the man approaches to the brute, so the brute seems to attain even to some share of human sagacity. The Hottentot and his bakely thus mutually assist each other; and when the latter happens to die, a new one is chosen to succeed him, by a council of the old men of the village. The new bakely is then joined with one of the veterans of his own kind, from whom he learns his art, becomes social and diligent, and is taken for life into human friendship and protection.


(Brahmin Bull)

The bisons, or cows with a hump, are found to differ very much from each other in the several parts of the world where they are found. The wild ones of this kind, as with us, are much larger than the tame. Some have horns, and some are without any; some have them depressed, and some raised in such a manner that they are used as weapons of annoyance or defence; some are extremely large; and others among them, such as the zebu, or Barbary cow, are very small. They are all, however, equally docile and gentle when tamed; and in general, furnished with a fine, lustrous, soft hair, more beautiful than that of our own breed; their hump is also of different sizes, in some weighing from forty to fifty pounds, in others less; it is not, however, to be considered as a part necessarily belonging to the animal; and probably it might be cut away without much injury: it resembles a gristly fat; and, as I am assured, cuts and tastes somewhat like a dressed udder.

Of all animals, except man alone, the cow seems most extensively propagated. Its nature seems equally capable of the rigours of heat and cold. It is an inhabitant as well of the frozen fields of Iceland, as the burning deserts of Lybia. It seems an ancient inmate in every climate, domestic and tame in those countries which have been civilized, savage and wild in the countries which are less led, but capable of being made useful in all; able to defend itself in a state



THE BUFFALO

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of nature against the most powerful enemy of the forest; and only subordinate to man whose force it has experienced, and whose aid it at last seems to require. However wild the calves are which are taken from the dam in a savage state either in Africa or Asia, they soon become humble, patient, and familiar; and man may be considered, in those countries, as almost helpless without their assistance. Other animals preserve their nature or their form with inflexible perseverance; but these, in every respect, suit themselves to the appetites and conveniences of mankind; and as their shapes are found to alter, so also does their nature; in no animal is there seen a greater variety of kinds, and in none a more humble and pliant disposition.

THE BUFFALO.—If we should compare the shape of our common cow with that of the bison, the difference will appear very great. The shaggy mane of the latter, the beard, the curled forehead, the inverted horns, the broad breast, and the narrow hinder parts, give it the appearance rather of a lion than a cow; and fit it more for a state of war with mankind, than a state of servitude. Yet notwithstanding these appearances, both animals are found to be the same; or at least, so nearly allied, that they breed among each other, and propagate a race that continues the kind.[*]

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[*] BUFFALOES.—Buffaloes in general are animals of a large stature, resembling the bull, low in proportion to their bulk and supported by strong, solid limbs.

Although in a domestic state the buffalo is not remarkable for docility, or attachment to its keeper, yet a feeling of this kind, mixed no doubt, with instructive antipathy, is exemplified in an anecdote related by Mr. D. Johnson.

"Two biparies, or carriers of grain and merchandise on the backs of bullocks, were driving a loaded string of these animals from Palamow to Chitrah; when they had come within a few miles of the latter place, a tiger seized on the man in the rear, which was seen by a *guallah* (herdsman) as he was watching his buffaloes grazing: he boldly ran up to the man's assistance, and cut the tiger very severely with his sword; upon which the ferocious animal dropped the biparie and seized the herdsman. The buffaloes observing it, attacked the tiger and rescued the herdsman; they tossed him about from one to the other, and, to the best of my recollection killed him. Both the wounded men were brought to me; the herdsman recovered, but the biparie died."

This anecdote reveals, if not attachment, great antipathy and courage; and it is well known that neither the lion nor the tiger are inclined to prey upon the buffalo, whose vengeance is probably kept alive by occasional depredations upon their young; and Indian herdsmen do not scruple to pass the night in the most dangerous jungle, seated upon the back of some favourite animal.

ANTIPATHY TO RED COLOURS.—Their extreme hostility to glaring colours is often remarked in India; the same is observed in Europe, and at the Cape. A general officer, now living, relates that while a young man, he was employed in surveying Hungary, and happening to use a small plain table, the back of which was covered with red morocco; as he walked from one station to another, he sometimes carried it with the paper against his breast, and the crimson colour in front. On a sudden, he perceived at a considerable distance a herd of grazing buffaloes throw out signs of defiance, and come down in full gallop towards him with their tails up, and evincing the most tumultuous frenzy. Not suspecting the cause, he paused and dropped his hand, when the whole troop stopped and looked about, as if at a loss; he went on, and unconsciously raising the table again brought the obnoxious colour in sight. They set off a second time towards him, but guessing the cause, he hid the red side from them and proceeded unmolested.

Of this species there are several varieties, quoted by Cuvier in his *Animal Kingdom*.

THE PACASSE. (*B. Pegasus*) Pliny relates that Ethiopia produced winged horses, armed with horns, named pegasi. Fathers Gallini and Carle observe that, "On the road to Loando, in the kingdom of Congo, they saw two *pacasses*, which are animals very similar to buffaloes, roaring like lions; the male and female being always together. They are white, with rufous and black spots; *with ears half a yard in length*, and the horns always straight." Lopes describes them as somewhat less than an ox, but similar in head and neck. Dapper reports them to be buffaloes of a reddish colour with long horns. These testimonies are vague, but still indicate one and the same animal partially misrepresented.

THE ARNEE.—India and China are the native regions of another group of true buffaloes, both wild and tame. The gigantic arnee is a rare species, only found in single families at the foot of the Himalaya mountains. A party of British officers of cavalry, stationed in the north of Bengal, went on a three months' hunting expedition to the

The buffalo is, upon the whole, by no means so beautiful a creature as the cow; his figure is more clumsy and awkward; his air is wilder; and he carries his head lower, and nearer the ground; his limbs are less fleshy, and his tail more naked of hair: his body is shorter and thicker than that of the cow kind, his legs are higher; his head smaller; his horns not so round, black, and compressed, with a bunch of curled hair hanging down between them; his skin is also harder and thicker, more black, and less furnished with hair; his flesh, which is hard and blackish, is not only disagreeable to the taste, but likewise to the smell. The milk of the female is by no means so good as that of the cow; it is, however, produced in great abundance. In the warm countries, almost all their cheese is made of the milk of the buffalo; and they supply butter also in large quantities. The veal of the young buffalo is not better eating than the beef of the old. The hide of this animal seems to be the most valuable thing he furnishes. The leather made of it is well known for its thickness, softness, and impenetrability. As these animals are, in general, larger and stronger than the

eastward, and destroyed in that time forty-two tigers, but only one arnee, though numerous wild buffaloes became their quarry. When the head of this specimen rested perpendicular on the ground, it required the outstretched arms of a man to hold the points of the horns. Captain Williamson, in his *Oriental Field Sports* evidently speaks of the true arnee in the anecdote where one of these animals pursued a sportsman to his elephant, and ran its horns under his belly to lift him up. The common arnee, is also a very large animal; these live gregariously in woods and swamps, occasionally floating in whole droves down the Ganges, seemingly asleep, until the current lands them on some island, or on the bank; boats are sometimes endangered by sailing in among them unawares.

They are said to plunge under water, and raise acquatic plants with their horns to the surface, and feed on them while driving down the stream.

A herd of these animals was observed by a column of troops, some years ago, on the march to Patna, by the inland road. On discovering the red dresses of the soldiers they threw out their usual signals of hostility, and galloped off; then suddenly wheeling round, came in a body, as if they intended to charge, and their horns overtopping their heads, rendered it doubtful whether they were not mounted by some hostile force; part of the column, therefore, halted and formed, and the animals suddenly struck by the glittering of the arms, stopped, turned tumultuously round, and dashed into cover.

The Cape Buffalo.—This species is designated by the Hottentots by the name of Qu'araho. It is distinguished by dark and rugous horns spreading horizontally over the summit of the head in the shape of a scalp.

There is some doubt whether Pliny alludes to this species in his description of the fierce African wild oxen, which were caught in pitfalls: the Araho is a truly terrible and ferocious beast, possessing a tremendous voice, and moving with considerable swiftness, but so ponderous as to be disinclined to ascend; its scent is keen, but the breadth of its horns impede its sight. This species live in small herds in brushwood and open forests of Caffraria, occasionally uniting in droves upon the plain. Professor Thunberg gives an appalling account of the destruction of two horses by one of these animals, the riders providentially escaping by climbing trees. Their hide is made into shields, cut into whips and traces, and is so hard that a musket ball will scarcely penetrate into it, unless the lead be mixed with tin. Since the increase of the settlements about the Cape of Good Hope, the buffalo is become more scarce in the colony, but they spread along the eastern side of Africa to an unknown distance in the interior.

The Domestic Buffalo.—The domestic buffalo is no doubt descended from the arnee. It is an animal at all times of very doubtful docility, with a sombre, malignant eye, active, daring, swift, and persevering when excited; possessed of great strength for burden and for the plough, two being equal in power to four horses; but furnishing little and indifferent milk, and worse flesh: the hide and horns are alone valuable. The domestic breed in Bengal is not more than four feet and a half high, and used to labour; but for burden, care is required to be taken that the goods they carry do not suffer from wet, their propensity to lie down in water being invincible; wood and bricks are, therefore, their most common load. The largest of the wild breed are used by the native princes, to supply the place of arnees, and fight with tigers in public shows. With the natives, they are docile; they ride on their favourite without fear. When driven along, the herds keep close together, so that the driver, if necessary, walks from the back of the one to the other, perfectly at his convenience. In Italy it is asserted that buffaloes have again become wild.

Major Smith.

cow they are usefully employed in agriculture. They are used in drawing burthens, and sometimes in carrying them; being guided by a ring, which is thrust through their nose. Two buffaloes yoked in a wagon are said to draw more than four strong horses; as their heads and necks are naturally bent downward, they are thus better fitted for the draught, and the whole weight of their bodies is applied to the carriage that is to be drawn forward.

Although these animals be chiefly found in the torrid zone, yet they are bred in several parts of Europe, particularly in Italy, where they make the food and the riches of the poor. The female produces but one at a time, in the same manner as the cow; but they are very different in the times of gestation; for the cow, as we know, goes but nine months, whereas the buffalo continues pregnant for twelve.

Having thus gone through the history of these animals, it may be proper to observe, that no names have been more indiscriminately used than those of the bull, the urus, the bison, and the buffalo. It, therefore, becomes such as would have distinct ideas of each, to be careful in separating the kinds, the one from the other, allowing the cow for the standard of all. The urus, whether of the large enormous kind of Lithuania, or the smaller race of Spain—whether with long or short horns—whether with or without long hair in the forehead, is every way the same with what our common breed was before they were taken from the forest, and reduced to a state of servitude. The bison, and all its varieties, which are known by a hump between the shoulders, is also to be ranked in the same class. This animal, whether with crooked or straight horns—whether they be turned towards the cheek, or totally wanting—whether it be large or diminutive—whatever be its colour, or whatever the length of its hair—whether called the bonasus by some, or the bubalus by others, is but a variety of the cow kind, with whom it breeds, and with whom of consequence it has the closest connexion. Lastly, the buffalo, though shaped much more like the cow is a distinct kind by itself, that never mixes with any of the former—that goes twelve months with young, whereas the cow goes but nine—that testifies an aversion to the latter, and though bred under the same roof, or feeding in the same pasture, has always kept separate, and makes a distinct race in all parts of the world. These two kinds are supposed to be the only real varieties in the cow kind, of which naturalists have given so many varieties. With respect to some circumstances mentioned by travellers—such as that of many kinds defending themselves by voiding their dung against their pursuers; this is a practice which they have in common with other timid creatures when pursued, and arises rather from fear than a desire of defence. The musky smell also by which some have been distinguished, is found common to many of these kinds, in a state of nature; and does not properly make the characteristic marks of any.* The particular kind of noise also which some of them are known to make, which rather resembles grunting than bellowing or lowing, is but a savage variety, which many wild animals have, and yet lose when brought into a state of tameness. For these reasons Mr. Buffon, whom I have followed in this description, is of opinion that the zebu, or little African cow, and the grunting, or Siberian cow, are but different races of the bison; as the shape of the horns, or the length of the hair, are never properly characteristic marks of any animal, but are found to vary with climate, food, and cultivation.

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* Musk Bull.—There is a Musk Bull which inhabits the interior parts of North America, on the west side of Hudson's Bay. It is in size equal to a Guernsey cow; the hair is brownish black, occasionally marked with large white blots; it grows to a very great length, and is composed of a long, soft down, intermixed with straight hairs; the summit of the head of the male is covered by the horns, which form a kind of scalp; in the female it is covered with hair; the legs are generally white, and the hair spreads forward under the heels, so as to cover the greater part of the frog. These animals live in herds of thirty or forty. The bulls are few in proportion to the cows, caused as it appears by the mortal conflicts among them for the possession of the females; for it is observed that dead males are often found, and that in the rutting season, the bulls are so jealous, that they run bellowing at every animal, to drive them off. They prefer mountains and barren grounds to wooded countries, climb rocks with agility and secure footing; they feed principally on grass, when in season, but mostly on mosses, the tops of pine shoots, and willows. The flesh is flavoured like that of the elk; the calves and heifers are best for the table, the meat of the old bulls being so impregnated with a musky smell as to be very disagreeable food. The genitals of the male are always lubricated with a musky, unctuous secretion, which is so powerful as to retain its smell for several years. Captain Parry met this species as far north as Melville Island, with the first appearance of spring: each carcass furnished him with from three hundred to three hun-

(Zebu.)

In this manner, the number of animals of the cow kind, which nautralists have extended to eight or ten sorts, are reduced to two; and as the utmost deference is paid to the opinion of Buffon in this particular, I have taken him for my guide.

Nevertheless, there is an animal of the cow kind, which neither he, nor any other naturalist that I know of, has hitherto described, yet which makes a very distinct class, and may be added as a third species. This animal was shown, some years ago, in London, and seemed to unite many of the characteristics of the cow and the hog—having the head, the horns, and the tail of the former, with the bristles, the colour, and the grunting of the latter. It is about the size of an ass, but broader and thicker; the colour resembling that of a hog, and the hair bristly, as in that animal. The hair upon the body was thin, as in the hog; and a row of bristles ran along the spine, rather shorter and softer than in the hog kind. The head was rather larger than that of a cow; the teeth were entirely resembling those of that animal, and the tongue was rough in like manner. It fed upon hay; and, consequently, its internal conformation must have resembled that of the cow kind more than the hog, whose food is always chosen of a kind more succulent. The eyes were placed in the head as with the cow, and were pretty nearly of the same colour; the horns were black and flattish, but bent rather backwards to the neck, as in the goat kind; the neck was short and thick, and the back rather rising in the middle; it was cloven-footed, like the cow, without those hinder claws that are found in the hog kinds. But the greatest variety of all in this extraordinary creature, which was a female, was, that it had but two teats, and, consequently, in that respect, resembled neither of the kinds to which, in other circumstances, it bore so strong a similitude. Whether this animal was a distinct kind, or a monster, I will not pretend to say; it was shown under the name of the bonasus; and it was said, by the person who showed it, to have come from India; but no credit is to be given to interested ignorance. The person only wanted to make the animal appear as extraordinary as possible; and, I believe, would scarcely scruple a lie or two, to increase that wonder in us, by which he found the means of living.

dred and fifty pounds of beef. It descends as far south as the province of Guivra, according to Lopez Gomara, where the Spaniards found sheep as large as a horse, with long hair, short tails, and enormous horns.—Captain Turner has likewise, in his account of an embassy to Thibet, described what he calls the Yak of Tartary, or Bushy-tailed Bull of Thibet. In common appearance it resembles the English bull; but it has a hunch on its back, and is covered over with a thick coat of long hair, which is manufactured into tents and ropes. But the greatest singularity is about their tails, which is composed of a prodigious quantity of long, flowing, glossy hair, which is furnished in such abundance, that not a joint of the tail is perceptible; but it has much the appearance of a large cluster of hair artificially set on Throughout the East these tails are in universal use, under the denomination of chowries, for driving away musquitoes, and other insects, from the face and person. These animals have a downcast, heavy look, and appear sullen and suspicious at the near approach of strangers. They do not low loud, like other cattle, but make a grunting noise, scarcely audible, when under some impression of uneasiness.

CHAP. VII.

ANIMALS OF THE SHEEP AND GOAT KIND *

As no two animals are found entirely the same, so it is not to be expected that any two races of animals should exactly correspond in every particular. The Goat and the Sheep are apparently different, in the form of their bodies, in their covering, and in their horns. They may from hence be considered as two different kinds, with regard to all common and domestic purposes. But if we come to examine them closer, and observe their internal conformation, no two animals can be more alike—their feet, their four stomachs, their suet, their appetites, all are entirely the same, and show the similitude between them; but what makes a much stronger connexion is, that they propagate with each other. The buck goat is found to produce with the ewe an animal that in two or three generations returns to the sheep, and seems to retain no marks of its ancient progenitor. (*g*) The sheep and the goat, therefore, may be considered as belonging to one family; and were the whole races reduced to one of each, they would quickly replenish the earth with their kind.

If we examine the sheep and goat internally, we shall find, as was said, that their conformation is entirely the same; nor is their structure very remote from that of the cow kind, which they resemble in their hoofs, and in their chewing the cud. Indeed, all ruminant animals are internally very much alike. The goat, the sheep, or the deer, exhibit to the eye of the anatomist the same parts in miniature which the cow or the bison exhibited in the great. But the differences between these animals are, nevertheless, sufficiently apparent. Nature has obviously marked the distinctions between the cow and the sheep kind, by their form and size; and they are also distinguished from those of the deer kind, by never shedding their horns. Indeed, the form and figure of these animals, if there were nothing else, would seldom fail of guiding us to the kind; and we might almost, upon sight, tell which belongs to the deer kind, and which are to be degraded into that of the goat. However, the annually shedding the horns in the deer, and the permanence in the sheep, draws a pretty exact line between the kinds: so that we may hold to this distinction only, and define the sheep and goat kind as ruminant animals of a smaller size, that never shed their horns.

If we consider these harmless and useful animals in one point of view, we shall find that both have been long reclaimed, and brought into a state of domestic servitude. Both seem to require protection from man, and are, in some measure, pleased with his society. The sheep, indeed, is the more serviceable creature of the two: but the goat has more sensibility and attachment. The attending upon both was once the employment of the wisest and the best of men: and those have been ever supposed the happiest times in which these harmless creatures were considered as the chief objects of human attention. In the earliest ages, the goat seemed rather the greater favourite; and, indeed, it continues such, in some countries, to this day among the poor. However, the sheep has long since become the principal object of human care; while the goat is disregarded by the generality of mankind, or become the possession only of the lowest of the people. The sheep, therefore, and its varieties, may be considered first; and the goat, with all those of its kind, will then properly follow.

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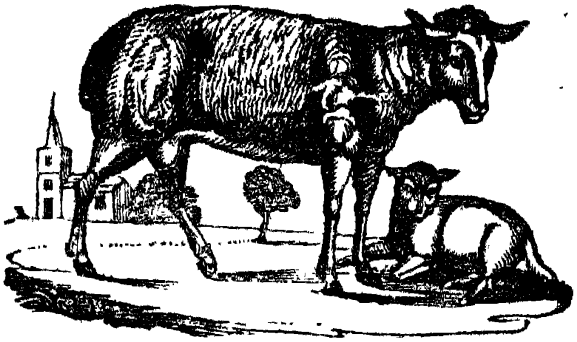
* In the Sheep kind, the horns are hollow, wrinkled, perennial, bent backwards and outwards, into a circular or spiral form, and generally placed at the sides of the head. In the lower jaw there are eight front teeth, but none in the upper; there are no canine teeth in either. In the Goat, the horns are hollow, rough, compressed, and rise somewhat erect from the top of the head, and bent backwards. There are eight front teeth in the lower jaw, none in the upper, and no canine teeth in either; the chin is bearded.

(*g*) Buffon, passim.



(White Face Sheep.)

THE SHEEP.—Those animals that take refuge under the protection of man in a few generations become indolent and helpless. Having lost the habit of self-defence, they seem to lose also the instincts of nature. The sheep, in its present domestic state, is of all animals the most defenceless and inoffensive.—With its liberty, it seems to have been deprived of its swiftness and cunning; and what in the ass might rather be called patience, in the sheep appears to be stupidity. With no one quality to fit it for self preservation, it makes vain efforts at all. They run together in flocks:—rather with the hopes of losing their single danger in the crowd, than of uniting to repress the attack by numbers. The sheep, therefore, were it exposed in its present state to struggle with its natural enemies of the forest, would soon be extirpated. Loaded with a heavy fleece, deprived of the defence of its horns, and rendered heavy, slow, and feeble, it can have no other safety than what it finds from man. This animal is now, therefore, obliged to rely solely upon that art for protection, to which it originally owes its degradation. But we are not to impute to Nature the formation of an animal so utterly unprovided against its enemies, and so unfit for defence. The mouflon, which is the sheep in a savage state, is a bold, fleet creature, able to escape from the greater animals by its swiftness, or to oppose the smaller kinds with the arms it has received from Nature.

(Black Face Sheep.)

The sheep, in its servile state, seems to be divested of all inclinations of its own; and of all animals it appears the most stupid. Every quadruped has a peculiar turn of countenance, a physiognomy, if we may so call it, that generally marks its nature. The sheep seems to have none of those traits that betoken either courage or cunning; its large eyes, separated from each other, its ears sticking out on each side, and its narrow nostrils, all testify the extreme simplicity of this creature; and the position of its horns also show that Nature designed the sheep rather for flight than combat.

The goat, which it resembles in so many other respects, is much its superior.*

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* THE GENUS OVIS.—Sheep are so nearly allied to goats, that the distinguishing characters of [illegible] genera are of a trivial character. [illegible] on, which in the former is almost [illegible] more or less elevated, is in the latter occasionally of the same form; the beard is not absolutely wanting in the one, and sometimes absent in the other. It was believed by the ancients, that sheep are of hybrid production; and the moderns still relate, that the commixture of the two species produce prolific breeds, said to be common in some parts of Russia, and also found in America. There are, however, no well-authenticated facts to establish the matter beyond a doubt; and the mere carelessness of the proprietors of flocks is certainly insufficient cause for their existence; for if the two genera intermixed with facility, and remained prolific, most countries would be without the pure breed of either, and possess only the intermediate; and above all, the west coast of Africa would be in that condition, because the wool is there no object, and not the least care is taken in breeding of the domestic animals; and yet several breeds of

The one has its particular attachments, sees danger, and generally contrives to escape it: but the other is timid without a cause, and secure when real danger approaches. Nor is the sheep, when bred up tame in the house, and familiarized with its keepers, less obstinately absurd: from being dull and timid, it then acquires a degree of pert familiarity; butts with its head, becomes mischievous, and shows itself every way unworthy of being singled out from the rest of the

goats and sheep exist, perfectly distinct, and without the smallest appearance of having mixed at any former period. 'If the Caprine, or goat genus, be endowed with a more indelible impression of its primitive characters, with more confidence and familiarity, a greater spirit of independence, combined with an elasticity of temperament fitted for all climates and soils, so as to render it an earlier associate of man, during the first dawnings of civilization, and cause it to multiply by his care in woods and swamps; the Ovine, though more timid, and, when domesticated, more helpless and delicate, must have become the most important acquisition, especially in the colder climates of the earth, as soon as the state of society and of the region would suffer its propagation. At first, no doubt, it was without wool, but certain parts of Asia have a natural tendency to prolong the fur of animals. Cashmere and the ridges of Caucasus, and the central parts of Asia Minor may be considered as the favourite nursery from whence the improved fleece-bearing animals have gradually spread over the rest of the world. It was at the foot of Caucasus that Jason obtained his celebrated spoils.

COURAGE OF SHEEP.—Sheep are certainly timid animals, but this shyness, as in other ruminants, is balanced by curiosity, and when once overcome, tends to extreme confidence. The courage of sheep is superior to that of goats. The males, both wild and tame, alike contend with each other for the possession of the females, by butting with the forehead and horns, running at each other with great force. The solidity of their skulls is such, that the domestic ram, whose blows strike low, will drive a bull out of the field. Rams, and even wethers, will attack, and sometimes kill, dogs or foxes. Instances of this kind are not uncommon in the mountainous parts of England. British shepherds are well acquainted with the cunning and the arts sheep will put in practice to elude their vigilance, when a young corn-field entices them to theft; and the Scottish and western mountaineers often witness their sagacity in anticipating a storm, by seeking timely shelter under a cliff, where sometimes it is necessary to dig them out of the snow, in which they become buried, without incurring any material injury.

SHEEP IN BRITAIN.—No history, ancient or modern, shows an equal instance of such persevering attention bestowed upon improving the breeds of domestic animals in general, and of sheep in particular, as Great Britain presents. The affluent leisure of the great emulating the practical science of the farmer, is alike engaged in a pursuit, which the sovereign himself has not disdained to support, and science has forwarded with all its means. When the attention of an enlightened and powerful nation is thus concentrated upon objects of real and practical utility. the result is invariably commensurate with the effort: and hence, not only horses and oxen, and even swine, have arrived at a very high standard of improvement—some, perhaps, at the highest attainable, consistent with the climate and circumstances of the case. With regard to sheep, it appears that the chief aim of improvement consists in combining the production of the best wool with the most delicate flesh, upon the least possible quantity of bone, at the smallest expense, and without injuring the vigour and hardiness of the animals. These advantages were not obtained but by slow degrees, great expense, and persevering attention. It is nearly twenty years since the system commenced, and its increasing importance may be traced by the comparative prices paid for the hire of rams for the season, and the rate of purchase for those possessed of prime qualifications. At that period, the best rams of the Leicester breed were let out for hire by the season, at sixteen and seventeen shillings a piece; and from that time the price kept rising from one guinea to ten, and even more. For the purchase of rams, four hundred guineas have been repeatedly given; and Bewick states that Mr. Bakewell, in 1789, made twelve hundred guineas by three rams, two thousand guineas of seven, and three thousand guineas of the remainder of his stock. The British sheep may be considered as forming two combined races, collectively distinguishable from others by a very delicately-formed head, the chaffron not much arched; those derived from the original or old breed with horns, the others mostly without. According to Mr. Culley, there are fourteen different breeds of sheep in the kingdom, all of them sufficiently distinguished by their horns or by being hornless, by the colour of their faces and legs, and by the length and quality of their wool.

BLACK-FACED HEATH BREED.—This race, usually termed *Short Sheep*, though now greatly absorbed in various other species, still exists in the north-west of Yorkshire, as far as Fort William in Scotland, and in one of flock. Thus it seems rather formed for slavery than friendship, and framed more for the necessities than the amusements of mankind. There is but one instance in which the sheep shows any attachment to its keeper, and that is seen rather on the continent, than among us in Great Britain. What I allude to is, their following the sound of the shepherd's pipe. Before I had seen them trained in this manner, I had no conception of those descriptions in the old

two of the northern English counties. Their eyes have a wild, fiery aspect, they run with great facility among the heathy mountains, and their flesh is peculiarly fine and high flavoured. They carry from three to four pounds of wool.

NORFOLK SHEEP.—These bear marks of their originating from the heath. This breed has a voracious appetite, and a restless disposition; they are good travellers, but not so valuable as others.

DORSET SHEEP.—These are also derived, probably, from the ancient stock. This breed has the peculiar property of producing lambs at almost any period of the year. They are particularly valued for supplying London, and other markets, with house lamb, which is brought to market by Christmas, or sooner.

Passing over the mere technical differences of the *Wiltshire* and *Herefordshire* breeds, we may allude here to a small-horned race in the north of Scotland and the Isles, said to have been once imported from Denmark or Norway. They are named *Dun-faced Sheep.* The same occurs in Zetland, where another breed of the race is gradually disappearing.

The largest sheep in Great Britain are to be met with on the banks of the Tees, which runs through a very rich and fertile country.

SHEEP OF THE SHETLAND ISLANDS. — Before we conclude these notes, we must take notice of a breed of sheep which have hitherto been but little known or attended to, though it is probable they possess advantages of equal importance with those we have just mentioned; and in all likelihood, they might have continued still longer in the same neglected state, but for the endeavours of a set of men, who, actuated by a truly patriotic zeal, are labouring to draw out the natural resource of their country, and secure, to the most distant and long neglected parts of the kingdom, those permanent advantages to which they are by their situation entitled. In pursuing these important objects, the Highland Society of Scotland have discovered that the Shetland Islands, and some parts of the Highlands of Scotland, are in possession of a breed of sheep, which produces wool infinitely superior to that of any other in the kingdom, and equal to Spanish wool in fineness and texture. By order of the society, specimens of these sheep have been obtained, for the purpose of a fair investigation into the nature and quality of their wool; which, upon examination, proves much finer than was at first imagined. The Shetland sheep are handsome, small, and in general hornless; and are peculiarly distinguished by the unusual shortness and smallness of their tails. They weigh, when fat, from eight to ten pounds per quarter. Their fleeces are upon an average, about two pounds weight. The wool, when properly dressed, is of a pure and glossy white; some small specimens of it, when compared with Vigognia wool, was allowed by good judges to be fully as fine, and in softness equal to that of which India shawls are made. The sheep producing this wool are of the hardiest nature; they are never housed, and in the winter season are often so pinched for food, that they are obliged to feed upon the sea-ware driven upon the shore. Besides the wool with which they are covered, they have long hairs growing amongst it, which serve to shelter it.

It is a singular circumstance, that the Shetland sheep are never shorn; but, about the beginning of June, the wool is pulled off, without the smallest pain or injury to the animal, leaving the long hairs already mentioned, which contribute to keep the creature warm and comfortable, at a season of the year when cold and piercing winds may be expected, in so northern a latitude. From the spirited measures which are now taking to preserve this valuable breed, we are led to hope that British wool may in time regain that great superiority for which it was once so famous; and that, by perseverance and attention to this important object, we may in time be enabled to produce not only as fine wool as can be obtained from any other country, but may also in the same breed be able to conjoin it with every other desirable peculiarity—such as closeness of fleece, beauty, utility of form, hardiness, a capability of being easily fattened, largeness of size, and other valuable qualities adapted to every peculiarity of situation in these islands.

BRITISH WOOL.—We alluded just now to the value of English wool in former times, over that of the present day. From the reign of Edward I., the wool produced was an article of immense value to the kingdom; and from Edward III. to Henry VII., the wool staple was an object of repeated legislative attention. It is curious, that in earlier periods the English breed was transported *to* Spain. "King Edward IV." says Baker, "enters into a league with John, King of Arragon, to whom he sent a score of Costal ewes and five rams, a small present in shew, but great in event; for it proved of more pastoral poets, of the shepherd leading his flock from one country to another. As I had been used only to see these harmless creatures driven before their keepers, I supposed that all the rest was but invention; but in many parts of the Alps, and even some provinces of France, the shepherd and his pipe are still continued, with true antique simplicity. The flock is regularly penned every evening, to preserve them from the wolf; and the shepherd returns homeward at sunset, with his sheep following him, and seemingly pleased with the sound of the pipe, which is blown with a reed, and resembles the chant of the bagpipe. In this manner, in those countries that still continue poor, the Arcadian life is preserved in all its former purity; but in countries where a greater inequality of conditions prevail, the shepherd is generally some poor wretch, who attends a flock from which he is to derive no benefits, and only guards those luxuries which he is not fated to share.

It does not appear, from early writers, that the sheep was bred in Britain; and it was not till several ages after this animal was cultivated, that the woollen manufacture was carried on among us. (g) That valuable branch of business lay for a considerable time in foreign hands; and we were obliged to import the cloth, manufactured from our own materials. There were, notwithstanding, many unavailing efforts among our kings to introduce and preserve the manufacture at home. Henry the Second, by a patent granted to the weavers in London, directed, that if any cloth was found made of a mixture of Spanish wool, it should be burned by the mayor. Such edicts at length, although but slowly, operated towards the establishing this trade among us. The Flemings, who at the revival of arts possessed the art of cloth-working in a superior degree, were invited to settle here; and, soon after, foreign cloth was prohibited from being worn in England. In the times of queen Elizabeth, this manufacture received every encouragement; and many of the inhabitants of the Netherlands being then forced, by the tyranny of Spain, to take refuge in this country, they improved us in those arts, in which we at present excel the rest of the world. Every art, however, has its rise, its meridian, and its decline; and it is supposed by many, that the woollen manufacture has for some time been decaying amongst us. The cloth now made is thought to be much worse than that of some years past; being neither so firm nor so fine, neither so much courted abroad, nor so serviceable at home.*

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benefit to Spain, and more detriment to England, than could at first have been imagined." From the middle of the fourteenth century, the government constantly endeavoured to introduce the manufacturers of woollens into this realm; and that the gradual success of these measures was chiefly owing to the turbulence of the weavers, and afterwards to the religious wars of the Netherlands, which brought them partly as exiles, partly as emigrants, to the British shores. The value of wool exported in the reign of Edward III. amounted to 150,000*l.* per annum; at present, the value of wool shorn in England, and no longer exported, is estimated at 5,000,000*l.* sterling, which, together with about 600,000*l.* of Spanish wool and some Saxon imported, is worth above 20,000,000*l.* per annum.

Wild Sheep of Great Britain.—It appears that in ancient times a wild species of sheep inhabited Great Britain. Boetius mentions a wild breed in St. Kilda, larger than the biggest goat, with tails hanging to the ground, and horns longer and as bulky as those of an ox. Pennant observes upon this subject, that such an animal is figured on a *bas-relief* taken out of the wall of Antoninus, near Glasgow.

* **Black Sheep.**—According to Giraldus Cambrensis (who, though a retailer of fables, may be perhaps credited in this), the Irish in his time were chiefly clothed in black garments, because their sheep, from which the wool was furnished, were black. (Vide *Topograph.*, and also *Collectan. de Reb. Hibern.*, xi.) When this is compared with what Southey tells us, in his *Letters from Spain*, namely, that in the north of the Peninsula, the sheep are almost all of a black colour; we may, perhaps, justly conclude, that the black Irish sheep, mentioned by old Giraldus, had been originally imported from Spain at the period, it may be, of the Milesian emigration. Those who are extensively acquainted with Ireland may be able to say whether this breed of black sheep is now propagated there.—J. R.—Loudon's Mag.

(g) British Zoology, vol. i. p. 23.

No country, however, produces such sheep as England; either with larger fleeces, or better adapted for the business of clothing. Those of Spain, indeed, are finer, and we generally require some of their wool to work up with our own; but the weight of a Spanish fleece is no way comparable to one of Lincoln or Warwickshire; and, in those counties, it is no uncommon thing to give fifty guineas for a ram.

This animal, in its domestic state, is too well known to require a detail of its peculiar habits, or of the arts which have been used to improve the breed. Indeed, in the eye of an observer of Nature, every art which tends to render the creature more helpless and useless to itself, may be considered rather as an injury than an improvement; and if we are to look for this animal in its noblest state, we must seek for it in the African desert, or the extensive plains of Siberia. Among the degenerate descendants of the wild sheep, there have been so many changes wrought, as entirely to disguise the kind, and often to mislead the observer. The variety is so great, that scarce any two countries has its sheep of the same kind; but there is found a manifest difference in all, either in size, the covering, the shape, or the horns.

Of the domestic kinds to be found in the different parts of the world, besides our own, which is common in Europe, the first variety is to be seen in Iceland, Muscovy, and the coldest climates of the north.* This, which may be called

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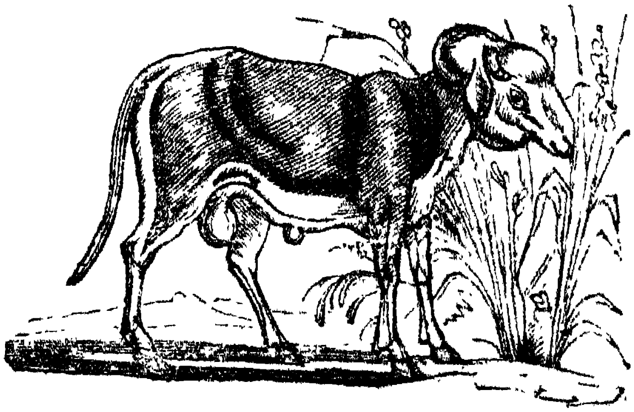
(Angola Sheep.)

* AFRICAN SHEEP.—Asia exhibits the most numerous and finest varieties in the breed of domestic goats, and Africa claims the greatest number of distinct varieties of sheep. In Africa, the gradations in the scale of domestication, appear to be distinguishable in the first place, by a decrease of bulk in the horns, retaining the original direction, or passing into the elongated spiral turns; by a partial retention of hair on the body, more or less mixed with wool; by the local accumulation of fat on certain parts; by the expansion and drooping of the ears; the lengthening of the tail, by the arching of the nasal bones or chaffron; and last, by the wool changing from white to dark brown and black. In proportion as one or more of these characters combined are observed, the breed recedes from the original type; but in reviewing the races by these indications, regard must still be had to the obvious influences of climate and circumstances.

THE WALLACHIAN SHEEP is derived from the Cretan, and resembles the old, unimproved breed of England in form, shape of the ears, and voluminous scrotum; but the wool, though curling, is rather course, and straight on the thighs and tail; the horns are very long, marked with a prominent ridge, diverging almost at right angles from the head, and twisted, in a lax, spiral form, into two turns and a half. The breed is white.

(Wallachian Sheep.)

A race of Europe, with horns of a peculiar character, so as to have been regarded as forming a distinct species, and named Strepsiceros by the moderns, is the Cretan. The animals are of a handsome form, with long horns, having a strong ridge at the base, and then three additional spiral twists, ascending vertically; the ears are small, drooping; the tail long; and the whole body covered with undulating wool, of rather a coarse quality; the face and legs are often speckled, or even entirely black.

ZUNA, OR GOITERED SHEEP OF ANGOLA, is a fourth of the Angola breed, low on the legs, with close hair, pendulous ears, and tail reaching to the fetlocks. It is very delithe Iceland sheep, resembles our breed, in the form of the body and the tail; but differs in a very extraordinary manner in the number of the horns; being generally found to have four, and sometimes even eight, growing from different parts of the forehead. These are large and formidable; and the animal seems thus fitted by Nature for a state of war: however, it is of the nature of the rest of its kind, being mild, gentle and timid. Its wool is very different, also, from that of the common sheep, being long, smooth, and hairy. Its colour is of a

cate, and has the singular peculiarity of a mass of fat rising in the form of a high collar behind the horns, and resting upon the occiput; the horns are very short, slender, turned inwards towards the forehead; upon the larynx another mass of fat hangs like a goitre under the throat; the forehead is so prominent, that a deep depression occurs between the eyes; the ears, neck, body, and superior parts of the tail, are pale brown; the head, goitre, throat, legs, belly, and inferior half of the tail, white. There are excellent figures of this breed in the celebrated collection of Prince Maurice of Nassau, the copies of which were immediately recognised by several of our late voyagers on the west coast of Africa.

The Parnassian Sheep.—A comparison of the different breeds of domesticated sheep and goats exhibits many striking differences, tending to confirm the broad distinction drawn between them. Sheep all agree in their habits, mode of life—in the details of their internal structure—in their horns being formed of hollow, wrinkled, angular sheaths, supported by bony processes—in the number, character, and form of their teeth, &c. The only particulars, in fact, in which they are said generically to differ, consist in the sheep having their horns directed backwards, and returning more or less in a spiral manner, with a generally convex line of profile, and no beard; while the goats have their horns directed upwards and backwards, their chins generally decorated with a long beard, and their line of profile always concave.

With regard to another point, the specific distinction between the different races of sheep, still met with in a state of nature, we have yet formed no decided opinion. It is certainly by no means easy to admit so marked an exception to the general laws that regulate the geographical distribution of animals as would be involved in the supposition that the same species is found in isolated regions, so widely differing from each other as the north of Africa and the south of Europe;—the great chain of the Caucasus, the wilds of Tartary and Siberia, and the rocky mountains of North America. And yet the distinguishing characters of each are in themselves so trivial, and the races pass into one another by such insensible gradations, especially when connected by means of the domesticated breeds, and propagate so readily a mixed breed, that we cannot but entertain doubts of the propriety of their separation from each other.

The fine Ram (*see Cut*) is the only specimen we have seen of a beautiful domesticated breed. In the large size, spiral twist, and lateral extension of its horns, it comes nearest to the Merino, which, however, it considerably exceeds in all these particulars. It differs, too, most essentially in the character of its wool, which, instead of being curled and tufted, is perfectly straight, and of very great length;—that which is derived from the middle of the back, falling on either side of the animal, almost to the ground; it is also very close set, and beautifully fine. The animal in question came from Mount Parnassus, and was presented to the Zoological Society by Dr. Bowring. It is like the sheep in general, extremely stupid, but at the same time vicious and unruly.

Asiatic Sheep.—The Asiatic sheep are partly of the same broad-tailed race as the African. Pallas mentions one with very few caudal vertebræ, but loaded on each side with a considerable and rounded mass of fat, separated beneath, but uniting at the tail. The wool is coarse, dark coloured, almost black; the hoofs long and the ears pendulous. This breed is found in China, Persia, and Southern Russia.

European Varieties.—Among the European varieties, may be mentioned the *many horned* of *Iceland*, the *Wallachian*, and the *Cretan*. But the most important continental race is the *Merino*.

The Merino is distinguished from British sheep, by bearing wool on the forehead and cheeks; the horns of the Ram are ponderous, the head is large, and the body rounded. There is a lax skin beneath the throat, which is in Spain esteemed a mark denoting a tendency to fine wool, and a heavy fleece; the females are without horns. This race produces the wool of the first quality for manufactures; it is abundant, very fine, soft to the touch, much packed, and twisted into the form of screws; oily, but shorter than in common sheep. The race, sub-divided into breeds, is extended over the greater part of Spain; large flocks are kept constantly travelling during the seasonable part of the year, and pent up during winter. The best breeds are those of Cavagne and Negrate; these are kept in pens during the cold season in Estramadura, on the left of the Guadiana, and from thence they move about the 15th of April, in flocks dark brown; and under its outward coat of hair, it has an internal covering, that rather resembles fur than wool, being fine, short, and soft.

The second variety to be found in this animal, is that of the broad-tailed sheep, so common in Tartary, Arabia, Persia, Barbary, Syria, and Egypt. This sheep is only remarkable for its large and heavy tail, which is often found to weigh from twenty to thirty pounds. It sometimes grows a foot broad, and is obliged to be supported by a small kind of board, that goes upon wheels.

With regard to their fleeces, in the temperate climates, they are, as in our own breed, soft and woolly; but in the warmer latitudes, they are hairy: yet in both they preserve the enormous size of their tails.* The third observable variety is that of the sheep called strepsicheros. This animal is a native of the islands of the Archipelago, and only differs from our sheep, in having straight horns, surrounded with a spiral furrow.

The last variety is that of the Guinea sheep, which is generally found in all the tropical climates, both of Africa and the East Indies. They are of a large size, with a rough, hairy skin, short horns, and ears hanging down, with a kind of dewlap under the chin. They differ greatly in form from the rest; and might be considered as animals of another kind, were they not known to breed with other sheep. These, of all the domestic kinds, seem to approach the nearest to the state of nature. They are larger, stronger, and swifter than the common race; and, consequently, better fitted for the precarious forest life. However, they seem to rely, like the rest, on man for support; being entirely of a domestic nature, and subsisting only in the warmer climates.†

Such are the varieties of this animal, which have been reduced into a state of domestic servitude. At the same time, while man thus cultivates the domestic kinds, he drives away and destroys the savage race, which are less beneficial, and more head-strong. These, therefore, are to be found in but a very small number, in the most uncultivated countries, where they have been able to subsist by their native swiftness and strength. It is in the more uncultivated parts of Greece, Sardinia, Corsica, and particularly in the deserts of Tartary, that the moufflon is to be found, that bears all the marks of being the primitive race; and that has been actually known to breed with the domestic animal.

The moufflon, or musmon, though covered with hair, bears a stronger similitude to the ram than any other animal; like the ram, it has the eyes placed near the horns; and its ears are shorter than those of the goat: it also resembles the ram in its horns, and in all the particular contours of its form.‡ The horns

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of two or three thousand, passing the Tagus to be shorn; after which operation they travel again towards the kingdom of Leon, where they are divided into flocks of five hundred head, and distributed on the grazing territory of Cervera, &c. The travelling breeds are called by the epithet of Transhumante to distinguish them from the Estante, or such as do not migrate. The fleece of merinos weighs, upon an average, from three to five pounds. In colour, the best are on the surface, dark brown, almost black, from the dust adhering to the greasy character of the pelt; beneath it is pure white, producing a striking contrast with the rosy hue of the skin; the harder the fleece and the more it resists pressure, the more close and fine will be the wool.—Cuvier—*abridged.*

* Broad-tailed Sheep.—Of this kind of sheep there are several varieties; the flesh of some of them is very good; the tails weigh from 15 to 50 lbs. These tails are esteemed a great delicacy, and are of a substance between fat and marrow. In Thibet the fleece is very fine, beautiful and long, and is worked into shawls. A number of this kind of sheep have been introduced into North America from the interior of Africa; they are said to be extremely valuable, both on account of the wool and the flesh; and the tail, in particular, which is eight or ten inches in breadth, is esteemed a great delicacy.—Loudon's Mag. Nat. Hist.

† Sheep of New South Wales are bred to an immense extent in New South Wales. In 1813, the number of sheep in the colony amounted to 6,514; in 1821, to 119,777. The exportation of wool to England during the last year exceeded a million of pounds, and at the same rate of increase, in 1840, will reach to between 30 and 40 millions of pounds. Bullocks are recommended for draught in preference to horses, and the speed of a well-taught, lively, strong bullock is little short of that of a horse.

Arcana of Science, 1828.

‡ The Musmon.—The ancients were ac-

also are alike are of a yellow colour; they have three sides, as in the ram, and ben wards in the same manner behind the ears. The muzzle, and the inside of the ears, are of a whitish colour, tinctured with yellow; the other parts of the face are of a brownish gray. The general colour of the hair over the body is of a brown, approaching to that of the red deer. The inside of the thighs and belly are of a white, tinctured with yellow. The form, upon the whole, seems more made for agility and strength than that of the common sheep; and the moufflon is actually found to live in a savage state, and maintain itself, either by force or swiftness, against all the animals that live by rapine. Such is its extreme speed, that many have been inclined rather to rank it among the deer kind, than the sheep. But in this they are deceived, as the musmon has a mark that entirely distinguishes it from that species, being known never to shed its horns. In some these are seen to grow to a surprising size; many of them measuring, in their convolutions, above two ells long. They are of a yellow colour, as was said; but the older the animal grows, the darker the horns become: with these they often maintain very furious battles between each other; and sometimes they are found broken off in such a manner, that the small animals of the forest creep into the cavity for shelter. (g) When the musmon is seen standing on the plain, his fore legs are always straight while his hinder legs seem bent under him; but in cases of more active necessity, this seeming deformity is removed, and he moves with great swiftness and agility. The female very much resembles the male of this species, but that she is less, and her horns also are never seen to grow to that prodigious size they are of in the wild ram. Such is the sheep in its savage state; a bold, noble, and even beautiful animal: but it is not the most beautiful creatures that are always found most useful to

quainted with this animal: Pliny notices the mumon, musmion and opheon. In Candia it is still said to be found. The mountaineers of Sardinia and Corsica are well acquainted with it by the name of mufro, and in former ages it abounded in Spain, and probably in all the high primitive chains of mountains in temperate Europe. If one species of ovis can make a direct claim to the progenitorship of the domestic breeds more than another, it would be the musmon and the bearded argali of Africa, which by the structure of its horns, is closely allied to the musmon; and both having proved that the intermixture with domestic sheep is readily accomplished, and the intermediate breed prolific. It is probable that African sheep first peopled the south and west of Europe, perhaps as early as the Asiatic, which may have spread themselves over Greece, Sicily, and the east of Italy; but a later period may be assigned to those which came round the Black Sea into the valley of the Danube; the northern nations of wooded Europe could not maintain them till a period comparatively recent.

Of the facility of breeding the Corsican musmon with our domestic sheep, proof was obtained from the specimen brought to England by the celebrated Pascal Paoli, which was the parent of a mixed progeny here.

The musmons of Sardinia and Corsica never quit the highest ridges; where, however, the temperature allows no permanent snows. They live in small herds, headed by an old male, uniting occasionally into flocks of near one hundred; but they separate again in December and January, when the rutting season commences, and the usual battles have decided how many females each male can retain. The females yean two lambs in April and May, which run about the moment they are dropped, and are cherished and defended with great constancy by their dams; they are not adult till the third year, but the power of procreation is the same as in the domestic races, and can commence at eighteen months. Their skins are used for various purposes by the Corsicans, and in that island and Sardinia, the mountaineers still convert them into vests, and a kind of cloak, which may be the present representatives of the *Mastruca Sardorum*, noticed in Cæsar's Commentaries, as made from the skin of the mufro, the Corsican name from which Buffon has formed the word moufflon; this dress was worn in particular by the inland robber, the *Mastruci Latrunculi.*—GRIFFITH IN CUVIER.

(g) Gmelin, as quoted by Buffon.

man. Human industry has, therefore, destroyed its grace, to improve its utility.*

THE GOAT, AND ITS NUMEROUS VARIETIES.—There are some domestic animals that seem as auxiliaries to the more useful sorts; and, that by ceasing to be the first, are considered as nothing. We have seen the services of the ass slighted, because inferior to those of the horse; and, in the same manner, those of the goat are held cheap, because the sheep so far exceeds it. Were the horse or the sheep removed from nature, the inferior kinds would then be invaluable; and the same arts would probably be bestowed in perfecting their kinds, that the higher order of animals have experienced. But in their present neglected state, they vary but little from the wild animals of the same kind; man has left them their pri-

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* Rocky Mountain Sheep.—The following information concerning this highly interesting animal is chiefly the copy of a letter addressed to the Philadelphia Agricultural Society.

The Rocky Mountain sheep inhabit the elevated region comprised in that portion of the mountain range from which its name is derived, situated between the 48th and 60th parallels of north latitude. They are found in great numbers near the head waters of the north fork of Columbia river, where their flesh constitutes the principal food of the natives. The country at the sources of Muddy River, (Marais River of Lewis and Clark,) Saskatchawin and Athabaska Rivers are also inhabited by them; but they are said to be less numerous on the eastern slope of the Rocky Mountains than upon the western; they are seldom or never seen at a distance from the mountains, the climate and productions of which appear best adapted to their nature and mode of life. In summer they resort to the peaks and ridges in quest of pasture, but retire to the valleys in winter. The size of the animal is nearly the same as that of the common sheep; their fleece is white, interspersed with long hair, protruding beyond the wool, and standing erect on the surface of the body, which gives them a shaggy appearance; their horns are short, merely projecting beyond the wool of the head, and slightly arcuated backwards; these together with their hoofs, are black, while the other parts of their bodies are uniformly white; their flesh has a musky flavour, and is, at best, unsavoury. They are of easy access to the hunter, who seldom pursues them unless compelled by hunger. Their fleece is esteemed of little value by the traders, and is used only as a covering to the feet during winter; their skin is of a remarkably thick and spongy texture. It has been asserted by good judges, that the silky fineness of the wool is not surpassed by that of the Cashmere goat.

The Puruk Sheep of Ladusk.—An interesting paper read before the *Royal Asiatic Society*, particularly notices a singular breed of sheep, of the Himalaya Mountains, by Mr. Moorecraft, says, "The Puruk sheep of Ladusk, when at full growth, is scarcely as large as a South Down lamb, six months old; yet, in fineness and weight of fleece, and flavour of mutton, added to its peculiarities of feeding and constitution, it yields not in merit to any race hitherto described. It gives two lambs in twelve months, and is twice shorn within that space: the clip may afford, in the annual aggregate, 3 lbs. and the first yield is fine enough for tolerably good shawls. The British flockmaster would be delighted with the fineness of the bone the spread of the carcass, the hardiness of its constitution, and its aptness to fatten. The Puruk sheep, if permitted, thrusts its head into the cooking-pot, picks up crumbs, is eager to drink the remains of a cup of salted and buttered tea, or broth, and examine the hand of its master for barley, flour, or for a cleanly picked bone, which it disdains not to nibble; a leaf of lettuce, a peeling of turnip, the skin of the apricot, are a luxury: and the industry is indefatigable with which this animal detects and appropriates substances so minute and uninviting, as would be unseen and neglected by ordinary sheep: perhaps the dog of the cottager is not so completely domesticated as it is. I have been minutely tedious upon their acquired habits of feeding as introductory to the conclusion that there exists not a cottager in Britain who might mitive habits and forms; and the less they owe to his assiduity, the more they receive from nature.*

The goat seems, in every respect, more fitted for a life of savage liberty than the sheep.(g) It is naturally more lively, and more possessed with animal

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not keep three of these sheep with more ease than he now keeps a cur dog; nor a little farmer, who might not maintain a flock of fifteen or twenty without appropriating half an acre exclusively to their use: they would derive support from that produce which now either totally runs to waste, or goes to the dunghill. I have procured some of the sheep, and mean to increase the stock to two hundred, leaving them under the care of a respectable lama for two years, at the end of which period my journey will have been completed. Should I fall, an event by no means impossible, government will receive them as a legacy, without expense, under the hope that some of the individuals will be sent to Britain; and in the sure expectation that the progeny will be distributed to cottagers and small farmers in poor and dry countries."—Loudon's Magazine. Nat. Hist.

* The Genus Capra.—It is a fact of a singular nature, that as far as geological observations have extended over fossil organic remains among the multitude of extinct and existing genera, and species of mammiferous animals, which the exercised eye of comparative anatomists have detected, no portions of Caprine or Ovine races have yet been satisfactorily authenticated; yet in a wild state the first are found in three quarters of the globe, and perhaps in the fourth; and the second most certainly exist in a very great portion of the earth, New Holland, perhaps, excepted. It would almost seem as if this class of animals were added, by the all-bountiful hand of Providence, to the stock of other creatures, for the express purpose of being the instruments which should lead man to industry and peace; at least, such an effect may, in a great measure, be ascribed to them, and if not the first companion, the goat may nevertheless, be regarded as the earliest passive means by which mankind entered upon an improving state of existence. The dog may have associated himself with the fortunes of human nature at an earlier period, but his society could lead no further than to mutual assistance, not to civilization. The goat and sheep, the best fruits of the united exertions of man and his canine associate, first slain and devoured, then caught, tamed, and reared, must have furnished obvious inducements to abandon the precarious life of a hunter. A gift of nature so evidently important, led to its usual effect upon minds without cultivation. The wandering shepherd guided his nightly course by the stars; he observed the connexion of the seasons by the passage of the sun through certain portions of the heavens; he named the stars within the range, after the objects most familiar to his mind, and his zodiac was formed with *Capricorn* and *Aries* among its members or houses. In the early mythologies, Pan the supreme power over nature, is portrayed with the insignia of the goat, and the Lybian Jupiter, with the horns of the Ram; Osiris, or the sun, during the vernal period of the year, assumes the same characters; and the Grecian Jupiter and Minerva claim alike the Ægis, or goat skin, for a breast-plate. Both the goat and sheep were held sacred to one or more divinities, and sacrificed at their altars. In the Jewish they were likewise sacrificed, but not with the same intention; for here the goat was expressly marked as emblematical of atonement, and in the Christian dispensation, the beautiful image of exalted innocence bearing the sins of mankind, is still retained in the figurative designation of the lamb.—Cuvier.

Peculiarities and Habits.—It would be difficult, if not impossible, to substantiate the descent of the present domestic breed of goats from any one particular species in a state of nature. The genus capra is distinguished from *antelope*, by many external peculiarities which it might be dry and tedious to explain here. A beard adorns the chin of nearly all the males, the ears are narrow and rounded at the tips, the fur is not very coarse, and the legs strong and thick. Goats are by nature inclined to ascend: in a wild state all the species reside on the most elevated mountains upon the borders of perpetual snow; and the domesticated, if they live in mountainous countries, will climb invariably while feeding, till the necessity of drinking, or the habits of education, again call them down. When mixed with sheep, they always take the lead, and the more helpless species follow their track. They are fearless, capricious, impudent, gregarious, not disinclined to associate even with man, but always in motion, ever in search of new objects, persevering yet inconstant. They spring with precision on the most difficult ground, love to look over precipices, and to perch on the highest accessible pinnacles. They walk on narrow ledges of rocks, and if two meet in such a place that neither can turn, one lies down and the other passes over its back. Mr. Bingly relates an anecdote of the kind, where two goats passed each other in this manner upon the *torus* of

(g) Buffon.

instinct. It easily attaches itself to man, and seems sensible of his caresses. It is also stronger and swifter, more courageous, and more playful, lively, capricious, and vagrant: it is not easily confined to its flock, but chooses its own pastures, and loves to stray remote from the rest. It chiefly delights in climbing precipices; in going to the very edge of danger: it is often seen suspended upon an eminence hanging over the sea, upon a very little base, and even sleeps there in security. Nature has, in some measure, fitted it for traversing these declivities with ease; the hoof is hollow underneath, with sharp edges, so that it walks as securely on the ridge of a house, as on the level ground. It is a hardy animal, and very easily sustained; for which reason it is chiefly the property of the poor, who have no pastures with which to supply it.

There are proofs of this animal being naturally the friend of man; and that the goat seldom resumes its primeval wildness, when once reduced into a state of servitude. In the year 1698, an English vessel happening to touch at the islands of Bonavista, two Negroes came, and offered the sailors as many goats as they chose to take away. Upon the captain's expressing his astonishment at this offer, the Negroes assured him that there were but twelve persons in the island, and that the goats were multiplied in such a manner as even to become a nuisance: they added, that instead of giving any trouble to catch them, they followed the few inhabitants that were left with a sort of obstinacy, and rather became importunate with their tameness.*

The goat produces but two at a time; and three at the most. But in the warmer climates, although the animal degenerates, and grows less, yet it becomes more fruitful, being generally found to bring forth three, four, and five at a single delivery. The buck is capable of propagating at the age of one year, and the female at seven months; however the fruits of this premature generation are weak and defective; and their best breeding-time is generally delayed till the age of two years, or eighteen months at least. One buck is sufficient for a hundred and fifty goats; his appetites are excessive: but this ardour brings on a speedy decay, so that he is enervated in four years at most, and even becomes old before he reaches his seventh year. The goat, like the sheep, continues five months with young; and, in some places, bears twice a year.

The milk of the goat is sweet, nourishing, and medicinal; not so apt to curdle upon the stomach as that of the cow; and, therefore, preferable to those whose digestion is but weak. The peculiarity of this animal's food gives the milk a flavour different from that either of the cow or the sheep; for as it generally feeds upon shrubby pastures, and heathy mountains, there is an agreeable wildness in the taste, very pleasing to such as are fond of that aliment. In several parts of Ireland and the Highlands of Scotland, the goat makes the chief possession of the inhabitants. On those mountains, where no other useful animal could find subsistence, the goat continues to glean a sufficient living, and supplies the hardy natives with what they consider as varied luxury.

One of the most remarkable varieties we find in the goat is in that of Natolia.

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the rampart of the citadel of Plymouth, overhanging the beach, in sight of a number of spectators. Their senses are accurate; they see to a great distance, and the faculty of smelling is very delicate, but in the choice of food they are not particular, often prefering bitter plants, and even manufactured tobacco, barking the trees and buds, and doing great mischief to the woods. Their structure is robust, their habits vigilant; the chase of them is, therefore, both laborious and dangerous: for every strange object is seen at a great distance. and if suspicious, avoided by a retreat, which defies the skill and industry even of the most intrepid hunters, and often causes his life to be sacrificed, by the dangers of the precipices, the ice, or the animal driven to despair, bolting down upon him, and plunging both head-long into the abyss.—GRIFFITH.

* TRACTABILITY.—Sonini, in his edition of Buffon's Natural History, has given us a curious instance of the readiness with which the goat will permit itself to be sucked by animals of a different kind, and far larger than itself. He assures us that he saw, in the year 1780, a foal that had lost its mother, thus nourished by a goat, which was placed on a barrel, in order that it might be sucked with greater convenience. The foal followed its nurse to pasture, as it would have done its parent; and was attended with the greatest care by the goat, which always called it back by her bleatings when it wandered any distance from her.

The Natolian goat, or, as Buffon calls it, the goat of Angora, has the ears longer than ours, and broader in proportion. The male has horns of about the same length with the goat of Europe, but black, and turned very differently, going out horizontally on each side of the head, and twisted round in the manner of a cork-screw. The horns of the female are shorter, and encircle the ear somewhat like those of the ram. They are of a dazzling white colour; and in all, the hair is very long, thick, fine, and glossy; which, indeed, is the case with almost all the animals of Syria. There are a great number of these animals about Angora, where the inhabitants drive a trade with their hair, which is sold, either raw or manufactured, into all parts of Europe. Nothing can exceed the beauty of the stuffs which are made from the hair of almost all the animals of that country. These are well known among us by the name of camlet.*

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* Goats of Thibet.—The project of introducing the breed of goats of Cashmere into Germany, has not been very favourably entertained. One writer has pretended to show that the European goat, by a single cross, might be brought to yield the precious article for which so much money is sent into Asia. Another argues against the Asiatic animal, on the ground that a single sheep of a good breed will bring four times the profits of a goat of Thibet; and a third, M. Schmidt, rejects their introduction into Germany, because France has anticipated that country in the manufacture of the merchandise in which their down is used. M. Schmidt makes the following observations on the fleece of these animals. Judging by their fleece, there are, he says, two sorts of goats; one which may be called the race of Angora, with hair long and pendent; the other, the goat of Thibet, with hair short and stiff. The former has no down; the latter, on the contrary, is covered, during winter, with a down which is more abundant and finer in those kept on the mountains. These two races, originally from Asia, have produced by their mixture, aided by the influence of climate, many varieties. On examining with attention the European goat, it will be found also that the long-haired ones have no down, or, if they have any, it is in very small quantities along the vertebral column; while of those which have short hair, there are to be found some which have a down spread over the entire carcass. This down grows almost to the length of hair in the spring, then comes off, and appears on the surface, to which it gives a gray tint. By the mixture of these breeds, a bastard race is formed, which have more or less down; but it is observed that the offspring partook more of the nature of the dam than of the sire. The two principal importations of the goats of Asia into Germany are those of M. Walmer of Geneva, who procured them directly from Thibet; and of M. Lowenherz, who received them from M. Ternaux; so that the former are goats of Thibet, the latter Kirguises. The Emperor of Austria, the Kings of Bavaria and Wurtemberg, all the Archdukes, and some private individuals, have procured goats of the former importation. They have been introduced into Saxony by M. de Buest, on his domain of Tossfell.—Arcana of Science, 1830.

Goat Skins and Hair.—The skins of these animals were, probably, among the first materials employed for clothing; afterwards, the long hair of the goat was mixed up with the short and soft fur of other animals, and united with the gum of trees, or animal glue, manufactured into that coarse and solid felt, known in northern Asia from the earliest ages, and noticed by historians and poets. It was probably of this material that the black war tunics of the Cimbri were made, in their conflicts with Marius; and we know it was the winter dress of the auxiliary cohorts, and even of the Roman legions in Britain—at least to the period of Constantine. But long before this period, the gradual advance of art was felt, even in the depth of northern Europe. The distaff had reached the Scandinavian nations, as well as we find it subsequently in the hands of the Mexicans; and the thread, at first platted into ribbons, afterwards enlarged and wrought, like matting, into a kind of thrum, was at length woven into narrow, and last of all into broad, pieces of cloth. In the ribbon plat, (*i.e.* plaid,) we see the origin of the check dresses common to most nations of northern latitudes, during their state of incipient civilization; for these were made by platting the ribbons into broader and warmer pieces; the stripes almost universal in the south, were the same plats sewed together. That goat's hair was the chief ingredient among the Scandinavians, is proved by their divinities being dressed in Geita Kurtlu. The domestic goat in the north and west of the old world, preceded sheep for many centuries, and predominated while the country was chiefly covered with forests; nor is there evidence of wool-bearing animals crossing the Rhine, or the Upper Danube, till towards the subversion of the Roman empire. In Spain, Southern Gaul, Italy, the shores of the Black Sea, and Greece, the case is otherwise: it may be

A second variety is the Assyrian goat of Gesner, which is somewhat larger than ours, with ears almost hanging down to the ground, and broad in proportion. The horns, on the contrary, are not above two inches and a half long, black, and bending a little backwards. The hair is of a fox colour; and under the throat there are two excrescences, like the gills of a cock. These animals are chiefly kept round Aleppo, for the sake of their milk. They are driven through the streets, and their milk is sold to the inhabitants as they pass along.

In the third variety may be reckoned the little goat of America, which is of the size of a kid, but the hair is as long as that of the ordinary breed. The horns, which do not exceed the length of a man's finger, are thick, and bent downwards so close to the head, that they almost enter the skin.

There is an animal of this kind at the Cape of Good Hope, called the blue goat, which may be ranked as the fourth variety. It is in shape like the domestic, but much larger, being nearly of the size of a stag. Its hair is very short, and of a delightful blue; but it loses a great deal of its beauty when the animal is dead. It has a very long beard; but the horns are not so long in proportion as in other goats, being turned spirally, in the manner of a cork-screw. It has very long legs, but well proportioned; and the flesh is very well tasted, but lean. For this reason, in that plentiful country, it is chiefly killed upon account of its skin. In fine, the Juda goat resembles ours in most parts, except in size, it being much smaller. This animal is common in Guinea, Angola, and all along the coasts of Africa: it is not much larger than a hare, but it is extremely fat, and its flesh admirably tasted. It is in that country universally prefered to mutton. These animals seem all of one kind, with very trifling distinctions between them.

(Ibex.)

But, although these are evidently known to belong to the goat kind, there are others nearly resembling the goat, of whose kindred we cannot be equally certain. These are such as, being found in a state of nature, have not as yet been sufficiently subjected to human observation. Hence it is impossible to determine with precision to which class they belong;—whether they be animals of a particular kind, or merely the goat in its state of savage freedom. Were there but one of these wild animals, the inquiry would soon be ended, and we might readily allow it for the parent stock; but in the present case, there are two kinds that have almost equal pretensions to this honour; and the claims of which it has been found difficult to determine. The animals in question are the chamois and the ibex. These both bear very near approaches to the goat in figure have horns that never shed; and, at the same time, are more different from each other than from the animal in question. From which of these two sources our domestic goat is derived is not easy to settle. Instead, therefore, of entering into the discussion, I will content myself with the result of Mr. Buffon's inquiries. He is of opinion that the ibex is the principal source, that our domestic goat is the immediate descendant, and that the chamois is but a variety from that stock, a sort of collateral branch of the same family. His principal reason for giving the preference to the ibex is its having a more masculine figure, large horns, and a large beard; whereas the chamois wants these marks of primitive strength and wildness. He supposes, therefore, in their original, savage state, that our goat has taken after the male of the parent stock,

conjectured that the mythological romance of the Argonauts rests upon the first importation of the breed of sheep into the land of taste and genius.—Cuvier.

and the chamois after the female; and that this has produced a variety in these animals, even before they underwent human cultivation.

However this be, the two animals in question seem both well fitted for their precarious life, being extremely swift, and capable of running with ease along the ledges of precipices, where even the wolf or the fox, though instigated by hunger, dares not pursue them. They are both natives of the Alps, the Pyrenees, and the mountains of Greece; there they propagate in vast numbers, and continue to exist in spite of the hunter and every beast of prey that is found incessantly to pursue them.

The ibex resembles the goat in the shape of its body; but differs in the horns, which are much larger:* they are bent backward, full of knots; and it is gene-

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* **The Ibex.**—The goats are not numerous in species; in Europe the ibex is the most celebrated. It is an animal near five feet long, two feet eight inches in height at the shoulder, with about two inches more at the rump. In its first year, the ibex is of a light ashy-gray colour, deepening to brown as it advances in age; and in the adult, varies from a red brown in summer, to a gray brown in winter. The ibex ruts in autumn; the male then emitting a most powerful smell, assembles the females, and remains with them till spring; when the females begin to withdraw into cover, for the purposes of parturition, which takes place in one hundred and sixty days after impregnation, usually in April; the kids following the mother in a few hours after their birth. The species seems to be confined to the highest mountains of Europe, the Alps, particularly the Rhætian and the Pyrenees, with their loftiest branches. They prefer the most elevated ridges, upon and near the verge of perpetual snow, which they invariably seek when pursued. In Savoy and Switzerland they are now rarer than in the Tyrol, and in the Pyrenees they are nearly extinct.

The Abyssinian Ibex is somewhat more elevated on the legs than the European, of a dirty, brownish, fawn colour, with a short beard, and lengthened hair under the throat down to the breast. This species is numerous in the mountain of Abyssinia and of Upper Egypt.

The Caucasian Ibex.—M. Guldenstadt first described this species, which he discovered in the northern part of the Caucasian mountains. In size and proportions, it resembles the ibex of Europe, but is broader and shorter in the body; dark brown on the superior parts, and white on the inferior. The hair of this species is hard, more ashy in winter, and at the root interspersed with much grayish underwool. This species of ibex is equal, if not superior, in strength and agility, to the Alpine, making immense bounds with the utmost confidence. Monardes relates that he saw an ibex leap from the top of a tower, and falling on its horns, immediately spring up and move on, without having received the slighest injury. It resides in the Caucasian mountains, and is probably found in the highest mountains of eastern Persia.

The Ægagrus is another species distinguished from the former by the horns forming an acute angle in front, with the ribs less broad, assuming an undulating edge, and the posterior part rounded. It is found in the Caucasian mountains, and in still greater abundance in Asia Minor. Pallas first clearly distinguished it from its congeners, and conjectured that the domestic goats might derive from the stock.

Cuvier's Animal Kingdom.

Goat of Cachemire. — The engraving of the Cachemire Goat is taken from the fine work of F. Cuvier and G. St. Hilaire. on mammiferous animals. The specimen in the Jardin des Plantes, at Paris, of which that work contains a portrait, was sent from Calcutta, having been obtained from the menagerie of the governor-general of India, where it was born of a couple that came direct from Cachemire to Bengal. The wool of this goat appears, by a scrupulous comparison, to be quite as delicate as the finest brought from Thibet. Cachemire, however, contains several breeds of goats with fine wool; a specimen was recently sent to England, which differed from that in France by having longer ears. But they all yield, apparently, the same produce; for the fineness of the wool is occasioned by the influence of the climate.

There are two sorts of hair which nature seems to have furnished, more or less, to every quadruped: the one fine, curly, generally gray, and imparting to the skin a down more or less thick, as if to guard it against cold and damp; the other coarse, flat, giving a general colour to the animal, and appearing in numerous instances to be an organ of sensation. These two sorts of hair generally become thicker, according to the degree of cold to which they are exposed; and the frizzled hair becomes gradually finer as the cold increases in dryness. It is this frizzled hair of the Cachemire goat which renders these animals so valuable; for to this we owe those delicate shawls which are so deservedly esteemed for a variety of qualities found in no other article of clothing rally asserted that there is a knot added every year. There are some of these found, if we may believe Bellonius, at least two yards long. The ibex has a large, black beard, is of a brown colour, with a thick, warm coat of hair. There is a streak of black runs along the top of the back; and the belly and back of the thighs are of a fawn colour

ANIMALS OF THE ANTELOPE KIND.*

The chamois, (*g*) though a wild animal, is very easily tamed, and docile; and to be found only in rocky and mountainous places. It is about the size of a

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The French have attempted to introduce this breed of goats into their own country; but the success of the experiment seems somewhat doubtful. It is, however, singular, as observed by Messrs. Cuvier and Hilaire, that no European has yet availed himself of the wool produced by most of our domestic goats, which, though less delicate than the Thibet, would undoubtedly have yielded a web far more fine and even than the most admired merino sheep.

The male goat in the menagerie of the Jardin des Plantes is admired for his symmetry, his graceful motion, and his quiet temper. But he has a much greater distinction--he is free from smell; whereas, nearly all European goats are known to emit a strong, unpleasant odour. The Cachemire goat is of middling size; two feet high at the neck joint, and two feet ten inches from the snout to the root of the tail; his head from the snout between the horns is nine inches, and his tail five. His horns are erect and spiral, diverging off towards the points. His silky hair is long, flat, and fine, instead of gathering up in bunches like that of the Angora goats. It is black about the head and neck, and white about the other parts of the body. The woolly hair is always of a grayish white, whatever be the colour of the rest.

* The Antelope Species.—We have divided Goldsmith's chapter, and place the Antelope race distinctly by itself, for naturalists now rank it as a separate species. This genus forms the head of the Caprine tribe, according to Cuvier, because its subordinate groups display, almost invariably, cervine proportions in the elegance of their conformation. We pass over the dry details of their characteristics considered scientifically. The groups of the antelope species with spiral and lyrated horns are mostly gregarious, frequenting the open plains, and often preferring the most barren tracts; the larger species, however, more usually live in families, or small troops, on the desert, or in mountainous woods; and the smallest are not unfrequently solitary, residing in the thickets, the forest, or the borders of rivers; while there are others whose habit is confined to mountainous regions, inaccessible crags, and even to the elevated zones on the confines of perpetual snow. These walk with perfect composure along the giddy brinks of the most awful precipices, climb and descend with wonderful care and precision, and leap down or up to the smallest surface that will contain their collected feet with perfect firmness; but the speed of those who frequent the plains, and more particularly of the swiftest species, consists in the alternate action of three or four strokes of a gallop, terminated by a long bound, repeated in constant succession, and producing a beautiful effect. Though vigilant and timid by nature, the gregarious species have the same curiosity which deer and sheep evince at the sight of strange objects; flying with prodigious speed, then stopping and turning to gaze. Their voice is mostly weak, and seldom heard; it consists in some in a feeble bleating; in others it is a groaning or whistling sound; and there is one which barks so as to deceive the unwary traveller into a belief that he is near the abode of man, when in fact it is the proof of his being benighted in the deepest recesses of the wood.

In a wild state, it seems that each species feeds on a few favourite plants; they pick rather than browse; some, like several species of deer, nibble the leaves of trees, acacias, mimosas, and shrubs. The gregarious keeping on the open plains, select grasses and their roots, heaths, wild triticea, and are not averse to bitter succulents and intoxicating plants, being even attracted by the smoke of tobacco. There is a disposition in several species to dung in one place, which arises probably from the extreme delicacy of their sense of smelling. In general their venison is lean, and savours of a musky or caprine smell; but the flesh of others is praised, and all afford the usual meal to the larger nocturnal carnivora, and even to the eagle. The females, particularly of the gregarious species, are gentle and confident when reduced to domesticity; but the males, at least in the rutting season, are vicious, and subject to sudden capricious fits. The beauty of their soft and large dark eyes has long been the

(*g*) M. Peroud's account, as quoted by Buffon.

domestic goat, and resembles one in many respects. It is most agreeably lively, and active beyond expression. The chamois' hair is short, like that of the doe; in spring it is of an ash colour, in autumn a dun colour, inclining to black, and in winter of a blackish brown. This animal is found in great plenty in the mountains of Dauphiny, of Piedmont, Savoy, Switzerland, and Germany. They are peaceful, gentle creatures, and live in society with each other. They are found in flocks of from four to fourscore, and even a hundred, dispersed upon the crags of the mountains. The large males are seen feeding detached from the rest—except in rutting time, when they approach the females, and drive away the young. The time of their coupling is from the beginning of November to the end of October; and they bring forth in April and March. The young keeps with the dam for about five months, and sometimes longer, if the hunters and the wolves do not separate them. It is asserted that they live between twenty and thirty years. Their flesh is good to eat; and they are found to have ten or twelve pounds of suet, which far surpasses that of the goat in hardness and goodness. The chamois has scarce any cry, as most animals are known to have; if it has any, it is a kind of feeble bleat, by which the parent calls its young. But in cases of danger, and when it is to warn the rest of the flock, it uses a hissing noise, which is heard at a great distance; for it is to be observed, that this creature is extremely vigilant, and has an eye the quickest and most piercing in nature; its smell also is not less distinguishing. When it sees its enemy distinctly, it stops for a moment; and then, if the person be near, in an instant after it flies off. In the same manner, by its smell, it can discover a man at half a league distance, and gives the earliest notice. Upon any alarm, therefore, or any apprehensions of danger, the chamois begins his hissing note with such force, that the rocks and the forests re-echo to the sound. The first hiss continues as long as the time of one inspiration. In the beginning it is very sharp, and deeper towards the close. The animal having, after this first alarm, reposed a moment, again looks round, and, perceiving the reality of its fears, continues to hiss by intervals, until it has spread the alarm to a very great distance. During this time, it seems in the most violent agitation: it strikes the ground with its fore foot, and sometimes with both; it bounds from rock to rock; it turns and looks round; it runs to the edge of the precipice; and, still perceiving the enemy, flies with all its speed. The chamois feeds upon the best herbage, and chooses the most delicate parts of the plants, the flower, and the tender buds. It is not less delicate with regard to several aromatic herbs, which grow upon the sides of the mountains. It drinks but very little while it feeds upon the succulent herbage, and chews the cud in the intervals of feeding. This animal is greatly admired for the beauty of its eyes, which are round and sparkling, and which mark the warmth of its constitution.

theme of Arabian and Persian poetical enthusiasm. The very name Gazelle, by which several of the genus are designated, is derived from the Arabic Gazal, signifying this animal, or a young fawn, is also an image of peculiarly tender and delicate women. It is likewise applied to a species of stanza, of a highly polished and tender versification, as the Gazels or Odes of Hafiz, for a translation of one of which, by the *Editor* of this volume, see *Mirror*, vol. xxii.: the root, however, seems taken from the Hindu Sasi, or Sasin, the name of the common antelope. It appears, that in the beautiful regions of the East, beyond the river Indus, these animals have attracted the notice of mankind in an extraordinary degree, even in the primitive ages of that land of early civilization, for we find them in the oldest mythologies, and among the symbols of its astronomy. The Sasin figures in the Rasi Chakra, or Hindu Zodiac, instead of Capricorn, the goddess Chandra, or the Moon, rides upon an Antelope, and Mahadeva Pancha Mukti holds one of these animals by the legs. In the *Institutes of Menu*, certainly more ancient than the Macedonian invasion, we find that under certain circumstances, the Brahmins were not only allowed, but directed to be fed on the flesh of the Ena, or spotted Antelope. From these causes, the whole genus is held sacred to Chandra, or the Moon; but it may be surmised that this consecration was originally confined to some species, perhaps still undescribed, whose horns exhibited a sort of resemblance to a crescent.—Ed.

Chamois.

They go to pasture both morning and evening, and seldom during the heat of the day. They run along the rocks with great ease and seeming indifference, and leap from one to another, so that no dogs are able to pursue them. There is nothing more extraordinary than to see them climbing and descending precipices, that to all other quadrupeds are inaccessible. They always mount or descend in an oblique direction; and throw themselves down a rock of thirty feet, and alight with great security upon some excrescence or fragment, on the side of the precipice, which is just large enough to place their feet upon; they strike the rock, however, in their descent, with their feet, three or four times, to stop the velocity of their motion; and when they have got upon their base below, they at once seem fixed and secure.

During the rigours of winter, the chamois sleeps in the thicker forests, and feeds upon the shrubs and the buds of the pine-tree. It sometimes turns up the snow with its foot to look for herbage; and, where it is green, makes a delicious repast. The more craggy and uneven the forest, the more this animal is pleased with the abode, which thus adds to its security. The hunting the chamois is very laborious, and extremely difficult. The most usual way is to hide behind the clefts of the rocks and shoot them. This, however, must be done with great precaution; the sportsman must creep for a vast way upon his belly, in silence, and take also the advantage of the wind, which if it blow from him they would instantly perceive. When arrived at a proper distance, he then advances his piece, which is to be rifle-barrelled, and to carry one ball, and tries his fortune among them. Some also pursue this animal as they do the stag, by placing proper persons at all the passages of a glade, or valley, and then sending in others to rouse the game. Dogs are quite useless in this chase, as they rather alarm than overtake. Nor is it without danger even to the men; for it often happens that when the animal finds itself overpressed, it drives at the hunters with its head, and often tumbles them down the neighbouring precipice. This animal cannot go upon ice when smooth; but if there be the least inequalities on its surface, it then bounds along in security, and quickly evades all pursuit.*

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*Chamois Hunters of the Alps.—These men are remarkable examples of what may be accomplished by courage, perseverance, and constant experiment. The chamois hunter sets out on his expedition of fatigue and danger, generally in the night. His object is to find himself at the break of day in the most elevated pastures, where the chamois comes to feed before the flocks shall have arrived there. The chamois feeds only at morning and in the evening. When the hunter has nearly reached the spot where he expects to find his quarry, he reconnoitres with a telescope. If he finds not the chamois, he mounts still higher; but if he discover him, he endeavours to climb above him, and to get nearer, by passing round some ravine, or gliding behind some eminence or rock. When he is near enough to distinguish the horns of the animals, he rests his rifle upon a rock, and takes his aim with great coolness. He rarely misses. The rifle is often double-barrelled. If the chamois fall he runs to his prey, makes sure of him by cutting the ham-strings, and applies himself to consider by what way he may best regain the village. If the route be difficult, he contents himself with skinning the chamois; but if the way be at all practicable with a load, he throws the animal over his shoulder, and bears it home to his family, undaunted by the distance he has to go, and the precipices he has to cross. But when, as is more frequently the case, the vigilant animal perceives the hunter, he flies with the greatest swiftness into the glaciers, leaping with incredible speed over the frozen snows and pointed rocks. It is particularly difficult to approach the chamois when there are many together. While the herd graze, one of them is planted as sentinel on the point of some rock which commands all the avenues of the pasturage; and when he perceives an object of alarm, he makes a sharp, hissing noise, at the sound of

The skin of the chamois was once famous, when tanned, for its softness and warmth; at present, however, since the art of tanning has been brought to greater perfection, the leather called shammoy is made also from those of the tame goat, the sheep and the deer.

Such are the quadrupeds that more peculiarly belong to the goat kind. Each of these, in all probability, can engender and breed with the other; and were the whole race extinguished, except any two, these would be sufficient to re-

which all the rest run towards him, to judge for themselves of the nature of the danger. If they discover a beast of prey, or a hunter, the most experienced puts himself at their head, and they bound along, one after the other, into the most inaccessible places. It is then that the labours of the hunter commence; for then, carried away by the excitement, he knows no danger. He crosses the snows without thinking of the abysses which they may cover; he plunges into the most dangerous passes of the mountains—he climbs up, he leaps from rock to rock, without considering how he can return. The night often finds him in the heat of the pursuit; but he does not give it up for this obstacle. He considers that the chamois will stop during the darkness, as well as himself, and that on the morrow he may reach them. He passes then the night, not at the foot of a tree, nor in a cave, covered with verdure, as does the hunter of the plain; but upon a naked rock, or upon a heap of rough stones, without any sort of shelter. He is alone, without fire, without lights, but he takes from his bag a bit of cheese and some of the barley bread, which is his ordinary food; bread so hard that he is obliged to break it between two stones, or to cleave it with the axe, which he always carries with him to cut steps which shall serve for his ladder up the rocks of ice His frugal meal being soon ended, he puts a stone under his head, and is presently asleep, dreaming of the way the chamois has taken He is awakened by the freshness of the morning air; he rises, pierced through with cold; he measures with his eyes the precipices he must yet climb, to reach the chamois; he drinks a little brandy, throws his bag across his shoulder, and again rushes forward to encounter new dangers. These daring and persevering hunters often remain whole days in the dreariest solitudes of the glaciers of Chamouni; and during this time, their families, and above all, their unhappy wives, feel the keenest alarm for their safety.

And yet, with the full knowledge of the dangers to be encountered, the chase of the chamois is the object of an insurmountable passion. Saussure knew a handsome young man of the district of Chamouni, who was about to be married; and the adventurous hunter thus addressed the naturalist:—"My grandfather was killed in the chase of the chamois; my father was killed also; and I am so certain that I shall be killed myself, that I call this bag which I always carry hunting, my winding-sheet; I am sure that I shall have no other; and yet, if you were to offer to make my fortune, upon the condition that I should renounce the chase of the chamois, I should refuse your kindness." Saussure adds, that he went several journeys in the Alps with this young man; that he possessed astonishing skill and strength, but that his temerity was greater than either; and that two years afterwards he met the fate which he anticipated, by his foot failing on the brink of a precipice to which he had leaped. It is the chase itself which attracts this people more than the value of the prey;—it is the alternation of hope and fear, the continual excitement—the very dangers themselves, which render the chamois-hunter indifferent to all other pleasures. The same passion for hardy adventure constitutes the chief charm of the soldier's and sailor's life; and like all other passions, to be safe and innocent, it must be indulged in great moderation, near akin as it is to one of the most senseless and mischievous propensities—gambling

The very few individuals of those who grow old in this trade, bear on their countenances the traces of the life which they have led. They have a wild, and somewhat haggard and desperate air, by which they may be recognised in the midst of a crowd. Many of the superstitious peasants. believe that they are sorcerers, that they have commerce with the evil spirit and that it is he that throws them over precipices. When the enormous glaciers and summits of Mont Blanc are beheld from the valleys, it is indeed almost miraculous that any mortal should be found hardy enough to climb them. To the traveller, or to the native of the vale of Chamouni, Mont Blanc is an object of awe and astonishment; and the devotion of the instructed, and the superstition of the unenlightened, are perhaps equally tributes to the God of nature, when they thus look upon one of the grandest of natural objects.

> "The dread ambassador from earth to heaven."

The chamois is now getting rare in Switzerland, in consequence of the inhabitants being allowed to hunt him at all seasons; but the race may be again expected to multiply, as the old regulations for determining the periods of hunting are again introduced.

plenish the world, and continue the kind. Nature, however, proceeds in her variations by slow and insensible degrees, and scarce draws a firm distinguished line between any two neighbouring races of animals whatsoever. Thus it is hard to discover where the sheep ends and the goat begins; and we shall find it still harder to fix precisely the boundaries between the goat kind and the deer. In all transitions from one kind to the other, there are to be found a middle race of animals, that seem to partake of the nature of both, and that can precisely be referred to neither. That race of quadrupeds, called the gazelles, are of this kind; they are properly neither goat nor deer, and yet they have many of the marks of both; they make the shade between these two kinds, and fill up the chasm in nature.*

Gazelle.

THE GAZELLES.—The gazelles, of which there are several kinds, can, with propriety, be referred neither to the goat nor the deer; and yet they partake of both natures.† Like the goat, they have hollow horns that never fall, which is otherwise in the deer. They have a gall-bladder, which is found in the goat and not in the deer; and like that animal, they feed rather upon shrubs than grassy pasture. On the other hand, they resemble the roe-buck in size and delicacy of form; they have deep pits under the eyes like that animal; they resemble the roe-buck in the colour and nature of their hair; they resemble him in the bunches upon their legs, which only differ in being upon the fore-legs in these, and on the hind legs in the other. They seem, therefore, to be of

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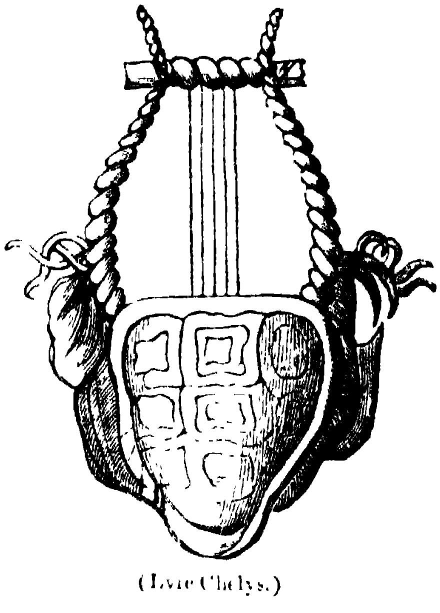
* Lyre Horns of the Chelys.—The form of the horns of the common antelope, when on the skull, is very similar to the ancient lyre, to which Pliny, in his Natural History, compares those of the Strepsiceros. The brachia, or sides of that instrument, were frequently made of the horns of animals, as appears from ancient gems. Montfaucon has engraved several.

To convey the idea of their structure, says Pennant, I caused the figure of one to be engraved, taken from the fifth volume of the Philosophical Transactions. I prefer this to


(Lyre Chelys.)

many other figures, as the shell of a tortoise forms its base—which gave rise to the beautiful comment on this passage in Horace, by Dr Molyneux:

O Testudinis aureæ
  Dulcem quæ strepitum, Pieri temporas!
O *mutis* quoque *piscibus*
  Donatura cygni, si libeat, sonum.

The art of giving to dumb fishes the voice of a swan was thought a strange idea, till that gentleman pointed out that a tortoise, (as above represented,) made part of the lyre: which animal was by the ancients ranked in the class of fish—(*Pliny*, *Nat. Hist.* lib ix. c. x.)—and even gave the name of χελυς to that species of musical instrument. Horace again invokes his lyre, by an address to the tortoise, which flings light on a seven-stringed one preserved in the supplement to Montfaucon:

Tuque Testudo resonare septem
  Callida nervis,
Nec loquax olim neque grata.

† The Gazelline Group.—Of the great genus antelope, there appear to be two parallel lines of affinities, descending with trifling interchanges of subordinate characters, down to the lower groups included in it. The first with horns in both sexes, through various classes till we arrive at those which depart from the slender structure of the former, and gradually assume more the characters of Capra and Ovis. The larger species live in families or herds, but the smaller are gregarious, keeping at a distance from wooded

a middle nature between these two kinds; or, to speak with greater truth and precision, they form a distinct kind by themselves

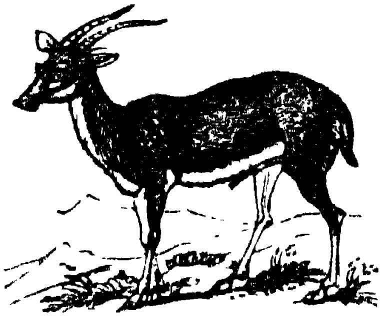
The distinguishing marks of this tribe of animals, by which they differ both from the goat and deer, are these: their horns are made differently, being annulated or ringed round, at the same time that there are longitudinated depressions running from the bottom to the point. They have bunches of hair upon their fore-legs; they have a streak of black, red, or brown, running along the lower part of their sides, and three streaks of whitish hair in the internal side of the ear. These are characters that none of them are without; besides these, there are others which, in general, they are found to have, and which are more obvious to the beholder. Of all animals in the world, the gazelle has the most beautiful eye, extremely brilliant, and yet so meek, that all the eastern poets compare the eyes of their mistresses to those of this animal.* A gazelle-eyed beauty is considered as the highest compliment that a lover can pay; and, indeed, the Greeks themselves thought it no inelegant piece of flattery to resemble the eyes of a beautiful woman to those of a cow. The gazelle, for the most part, is more delicately and finely limbed than even the roe-buck; its hair is as short, but finer and more glossy. Its hinder legs are longer than those before, as in the hare, which gives it greater security in ascending or descending steep places. Their swiftness is equal, if not superior to that of the roe; but as the latter bounds forward, so these run along in an even uninterrupted course. Most of them are brown upon the back, white under the belly, with a black stripe, separating those colours between. Their tails are of various lengths, but in all covered with pretty long hair; and their ears are beautiful, well placed, and terminating in a point. They all have a cloven hoof, like the sheep; they all have permanent horns; and the female has them smaller than the male.

Of these animals, Buffon makes twelve varieties; which, however, is much fewer than what other naturalists have made them. The first is the Gazella, properly so called, which is of the size of the roe-buck, and very much resembling it in all the proportions of its body, but entirely differing, as was said, in the nature and fashion of the horns, which are black and hollow, like those of the ram, or the goat, and never fall. The second he calls the Kevel, which is rather less than the former; its eyes also seem larger; and its horns, instead of being round, are flatted on the sides, as well in the male as the female. The third he calls the Corin, which very much resembles the two former, but that it is still less than either. Its horns also are smaller in proportion, smoother than

scenes, and residing principally on the barren deserts; these, however, they will quit in the night, to approach cultivation, and it is said in the desolated provinces of Abyssinia, they are fond of resorting to the fields, where the result of former agriculture has left abundance of grain growing wild, to seek cover and food, and thus concealed, they are hunted with difficulty. The Arabs and Bedouins of Africa and Western Asia, sometimes shoot them by watching their approach to the springs, or hunt them by contriving to get suddenly among the herd, and throwing a heavy stick horizontally at the nearest, and generally breaking the legs of one or more. The nobles in Persia, and the wealthy Turks, and Moors pursue them with the hawk, or slip the Persian lynx to surprise them; but in all these cases, even when the hawk is flown, it is necessary to circumvent the quarry, unless the herd be so large as to exceed the bounds of alarm, or it would be labour in vain to reach them Although they feed most about dawn and twilight, wandering travellers sometimes come suddenly at night upon a herd, and it is observed, that if no dogs be present, they will scarcely rise and go further than a short distance to lie down again; but if unusual noise disturb them, the whole trot off and evince symptoms of anxiety till the return of day-light —CUVIER.

* THE EYES OF THE GAZELLE —The sacred writers took their similes from such objects as were before the eyes of the people to whom they addressed themselves. As an instance, the disciple raised to life at Joppa was supposed to have been called Tabitha, i.e Dorcas, or the antelope. from the beauty of her eyes. And to this day, one of the highest compliments that can be paid to female beauty in the eastern regions is *Aine el lezozel*, "You have the eyes of an antelope." The fleetness of the antelope was proverbial, even in the earliest times: the speed of Asahel (2nd Samuel ii 18.) is beautifully compared to that of the zebi, and the Gadites were said to be as swift as the antelopes upon the mountains.

those of the other two, and the annular prominences belonging to the kind are scarce discernible, and may rather be called wrinkles than prominences. Some of these animals are often seen streaked like the tiger. These three are supposed to be of the same species. The fourth he calls the Zeiran, the horns only of which he has seen; which from their size, and the description of travellers, he supposes to belong to a larger kind of the gazelle, found in India and Persia, under that denomination.


Kevel.

The fifth he calls the Koba, and the sixth the Kob; these two differ from each other only in size, the former being much larger than the latter. The muzzle of these animals is much longer than those of the ordinary gazelle; the head is differently shaped, and they have no depressions under the eyes. The seventh he calls after its Egyptian name, the Algazel; which is shaped pretty much like the ordinary gazelle, except that the horns are much longer, being generally three feet from the point to the insertion; whereas, in the common gazelle, they are not above a foot; they are smaller also, and straighter till near the extremities, when they turn short, with a very sharp flexure they are black and smooth, and the annular prominences are scarcely observable. The eighth is called the Pazan; or, by some, the Bezoar goat, which greatly resembles the former, except a small variety in their horns; and also with this difference, that as the algazel feeds upon the plains, this is only found in the mountains. They are both inhabitants of the same countries and climate; being found in Egypt, Arabia, and Persia. This last is the animal famous for that concretion in the intestines or stomach, called the oriental bezoar, which was once in such repute all over the world for its medicinal virtues. The word bezoar is supposed to take its name either from the pazan or pazar, which is the animal that produces it; or from a word in the Arabic language, which signifies antidote, or counter-poison. It is a stone of a glazed blackish colour, found in the stomach, or the intestines of some animal, and brought over to us from the East Indies. Like all other animal concretions, it is found to have a kind of nucleus or hard substance within, upon which the external coatings were formed, for, upon being sawed through, it is seen to have layer over layer, as in an onion. This nucleus is of various kinds; sometimes the buds of a shrub, sometimes a piece of stone, and sometimes a marcasite. This stone is from the size of an acorn to that of a pigeon's egg; the larger the stone, the more valuable it is held; its price increasing, like that of a diamond There was a time when a stone of four ounces sold in Europe for above two hundred pounds; but, at present, the price is greatly fallen, and they are in very little esteem. The bezoar is of various colours; sometimes of a blood colour, sometimes of a pale yellow, and of all the shades between these two. It is generally glossy, smooth, and has a fragrant smell, like that of ambergrease, probably arising from the aromatic vegetables upon which the animal that produces it, feeds. It has been given in vertigoes, epilepsies, palpitations of the heart, colic, jaundice, and, in those places where the dearness, and not the value of medicines, is consulted, in almost every disor-

Corin.

Algazel.

der incident to man. In all, perhaps, it is equally efficacious, acting only as an absorbent powder, and possessing virtues equal to common chalk, or crabs' claws. Judicious physicians have, therefore, discarded it, and this celebrated medicine is now chiefly consumed in countries where the knowledge of nature has been but little advanced.

To return, therefore, to the varieties in the gazelle tribe, the ninth is called the Ranguer, and is a native of Senegal. This differs somewhat in shape and colour from the rest; but particularly in the shape of its horns, which are straight to near the points, where they crook forward, pretty much in the same manner as in the chamois they crook backward. The tenth variety of the gazelle is the Antelope, so well known to the English, who have given it the name This animal is of the size of a roe buck, and resembles the gazelle in many particulars, but differs in others: it has deeper eye-pits than the former; the horns are formed differently also, being about sixteen inches long, almost touching each other at the bottom, and spreading as they rise, so as at their tips to be sixteen inches asunder They have the annular prominences of their kind, but not so distinguishable as in the gazelle however, they have a double flexure, which is very remarkable, and serves to distinguish them from all others of their kind. At the root they have a tuft of hair, which is longer than that of any part of the body Like others of the same kind, the antelope is brown on the back, and white under the belly; but these colours are not separated by the black streak which is to be found in all the rest of the gazelle kinds. There are different sorts of this animal, some with larger horns than others, and others with less. The one which makes the eleventh variety in the gazelle kind, Mr Buffon calls the Lidme, which has very long horns, and the other, which is the twelfth and last, he calls the Indian Antelope, the horns of which are very small.*

(The Antelope.)

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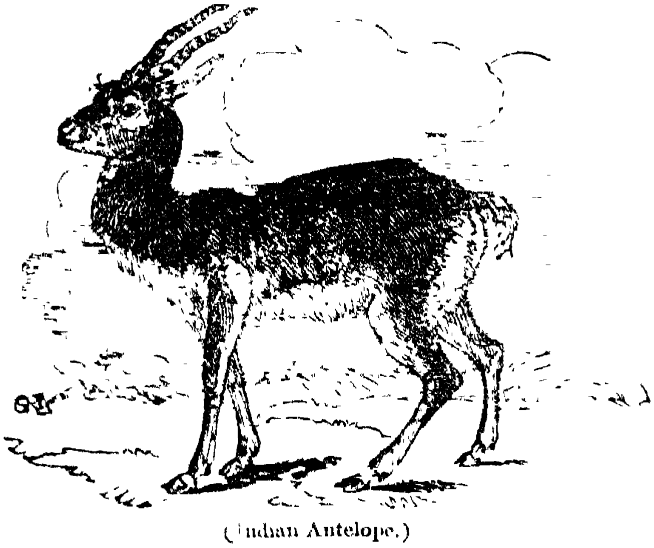
* THE INDIAN ANTELOPE.—This species resides in India, in herds of fifty or sixty does, or females, led by a dark-coloured buck They remain invariably on the open plains, so as to see danger from a distance Captain Williamson and other sportsmen state, that when a herd is collected to lie down and ruminate on some favourite spot, the young males and some females are detached two or three hundred yards each way, to keep watch, especially if there be clumps of grass or bushes, behind which a man might lurk unseen, except for such a precaution.—"It is folly," says he, "to slip greyhounds after them; for, excepting by surprise, success is not to be expected, but perhaps at the expense of their lives" The height and distance of their bounds is indeed wonderful, and said to be at least twelve feet from the ground, and over twenty-five or thirty feet of space, and as it were for their own amusement, appearing to deride the dogs that follow them. The chase,

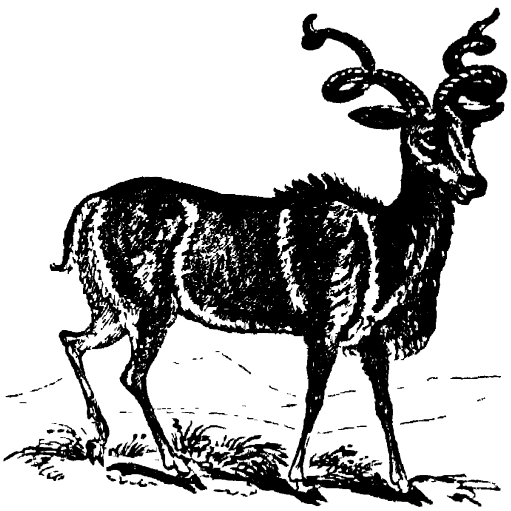


(Indian Antelope.)

To these may be added three or four varieties more, which it is not easy to tell whether to refer to the goat or the gazelle, as they equally resemble both The first of these is the Bubalus, an animal that seems to partake of the mixed natures of the cow, the goat, and the deer. It resembles the stag in the size and figure of its body, and particularly in the shape of its legs; but it has permanent horns, like the goat, and made entirely like those of the gazelle kind; it also resembles that animal in its way of living; however, it differs in the make of its head, being exactly like the cow in the length of its muzzle, and in the disposition of the bones of its skull, from which similitude it has taken its name.

The bubalus is common enough in Barbary, and has often been called by the name of the Barbary Cow, from which animal it differs so widely. It partakes pretty much of the nature of the antelope—like that having the hair short, the hide black, the ears pointed, and the flesh good for food.

The second anomalous animal of the goat kind Buffon calls the Condoma. It is supposed to be equal in size to the largest stag, but with hollow horns, like those of the goat kind, and with varied flexures, like those of the antelope. They are above three feet long; and, at their extremities, about two feet asunder. All along the back there runs a white list, which ends at the insertion of the tail; another of the same colour crosses this, at the bottom of the neck, which it entirely surrounds; there are two more of the same kind running round the body, one behind the fore legs, and the other running parallel to it before the hinder. The colour of the rest of the body is grayish, except the belly, which is white: it has also a long, gray beard; and its legs, though long, are well proportioned.


(Condoma.)

The third that may be mentioned, he calls the Guiba. It resembles the gazelles in every particular, except in the colour of the belly, which, as we have seen, is white in them, but in this is of a deep brown. Its horns also are not marked with annular prominences, but are smooth and polished. It is also remarkable for white lists, on a brown ground, that are disposed along the animal's body, as if it were covered with a harness. Like the former, it is a native of Africa.

The African wild goat of Grimmius is the fourth. It is of a dark ash colour; and in the middle of the head is a hairy tuft, standing upright; on both sides, between the eyes and the nose, there are very deep cavities, greater than those of the other kinds, which contain a yellow oily liquor, coadgulating into a black substance, that has a smell between musk and civet. This being taken away, the liquor again runs out, and coadgulates, as before. These cavities have no communication with the eyes, and, consequently, this oozing substance can have nothing of the nature of tears.

To this we add the Chevrotin, or little Guinea deer, which is the least of all cloven-footed quadrupeds, and perhaps the most beautiful; its legs, at the smallest part, are not much thicker than the flank of a tobacco-pipe; it is about seven inches high, and about twelve from the point of the nose to the insertion of the tail. It is the most delicately shaped animal in the world, being completely formed like a stag in miniature—except that its horns, when it has any, are more of the gazelle kind, being hollow and annulated in the same manner.

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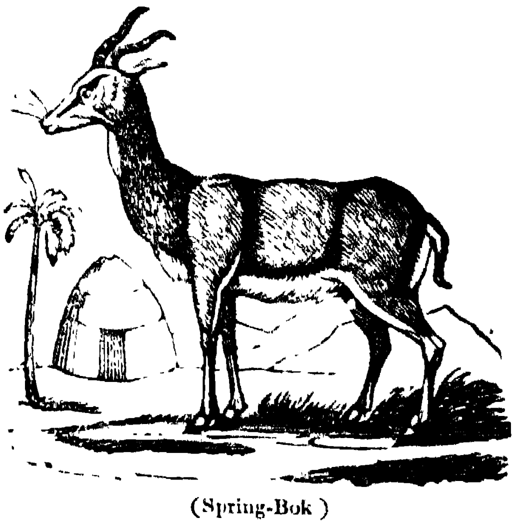
therefore, as an amusement, (for the venison is dry and lean,) is conducted by the Hindoo princes, with hawks, who fly at and fix their talons on the head and throat of the quarry, till the dogs come up; or by surprise, with the lynx, as in Persia. They are found over the whole peninsula of India.

ORIENTAL FIELD SPORTS.

It has two canine teeth in the upper jaw; in which respect it differs from all other animals of the goat or deer kind, and thus makes a species entirely distinct by itself. This wonderful animal's colour is not less pleasing; the hair, which is short and glossy, being in some of a beautiful yellow, except on the neck and belly, which is white. They are natives of India, Guinea, and the warm climates between the tropics, and are found in great plenty.*

* Additional of this Species.—There are several other antelopes not mentioned by Goldsmith, which we append here, and first,

The Spring-Bok. This animal is well known to the colonists at the Cape. "It is easily distinguished," says Mr. Burchell, "from all the known species, by the very long, white hair along the middle of the back, which, lying flat, is concealed nearly by the fur on each side, and is expanded only when it takes those extraordinary leaps which first suggested its name." The same writer's description of a herd of spring-boks is very picturesque: "At this high level, we entered upon a very extensive, open plain, abounding to an incredible degree in wild animals;—among which were several large herds of quakkas, and many *wilde beests*, or *gnus;* but the *spring-bucks* were far the most numerous, and, like flocks of sheep, completely covered several parts of the plain. Their uncertain movements rendered it impossible to estimate their number; but, I believe, if I were to guess at two thousand, I should still be within the truth. This is one of the most beautiful of the antelopes of southern Africa, and it is certainly one of the most numerous.



(Spring-Bok.)

The plain afforded no other object to fix the attention; and even if it had presented many, I should not readily have ceased admiring these elegant animals. It was only occasionally that they took those remarkable leaps, which have been the origin of the name; but when grazing, or moving at leisure, they walked or trotted like other antelopes, or as the common deer. When pursued or hastening their pace, they frequently took an extraordinary bound, rising with curved or elevated backs high into the air—generally to the height of eight feet, and appearing as if about to take flight. Some of the herds moved by us almost at musket-shot; and I observed, that in crossing the beaten road, the greater number cleared it by one of those flying leaps. As the road was quite smooth and level with the plain, there was no necessity for the leaping over it; but it seemed that the fear of a snare, or a natural disposition to regard man as an enemy, induced them to mistrust even the ground which he had trodden. The migrations of innumerable companies of spring-boks, from unknown regions in the interior of Africa to the abodes of civilization, are amongst the most extraordinary examples of the fecundity of animal life. The vast quantity of a species of birds of South America, which produce the *guano*, (a manure,) in sufficient abundance to be an article of commerce—the flocks of pigeons of North America—the locusts of Africa—are not more striking than herds of spring-boks. The immense migratory swarms of these animals which occasionally pour themselves like a deluge upon the northern frontiers of the Cape colony, have never been more vividly described than by Captain Stockenstrom, the chief civil commissioner at the Cape.

"It is scarcely possible for a person passing over some of the extensive tracts of the interior, and admiring that elegant antelope, the spring-bok, thinly scattered over the plains, and bounding in playful innocence, to figure to himself that these ornaments of the desert can often become as destructive as the locusts themselves. The incredible numbers which sometimes pour in from the north, during protracted droughts, distress the farmer inconceivably. Any attempt at numerical computation would be in vain. In the interior, the grazier makes up his mind to look for pasture for his flocks elsewhere, and considers himself entirely dispossessed of his lands until heavy rains fall. Every attempt to save the cultivated fields, if they be not inclosed by high and thick hedges, proves abortive. Heaps of dry manure are placed close to each other round the fields, and set on fire in the evening, in hopes that the dense smoke will deter the inroads of the antelope; but the dawn of day exposes the inefficacy of the precaution, by showing the lands which appeared proud of their promising verdure the evening before, covered with thousands, and reaped level with the

Such is the list of the gazelles, all which pretty nearly resemble the deer in form and delicacy of shape: but have the horns hollow, single, and permanent, like those of the goat. They properly fill up, as has been already observed, the interval between these two kinds of animals; so that it is difficult to tell where the goat ends, and the deer may be said to begin.

The gazelles are, in general, inhabitants of the warmer climates; and contribute, among other embellishments, to add beauty to those forests that are for ever green. They are often seen feeding in herds, on the sides of the mountain, or in the shade of the woods; and fly altogether, upon the smallest approaches of danger. They bound with such swiftness, and are so very shy, that dogs or men vainly attempt to pursue them. Accordingly, in all those countries where they are chiefly found, they are pursued by falcons; and this admirable manner of hunting makes one of the principal amusements of the upper ranks of people all over the east.

The Arabians, Persians, and Turks breed up for this purpose that kind of hawk called the Falcon Gentle. Their expedition is conducted with profound silence; their dogs are taught to hang behind; while the men, on the fleetest coursers, look round for the game. Whenever they spy a gazelle at the proper distance, they point the falcon to its object, and encourage it to pursue. The falcon, with the swiftness of an arrow, flies to the animal; that, knowing its danger, endeavours, but too late, to escape. The falcon soon coming up with its prey, fixes its talons, one into the animal's cheek, the other into its throat, and deeply wounds it. On the other hand, the gazelle attempts to escape, but is generally wounded too deeply to run far. The falcon clings with the utmost perseverance, nor ever leaves its prey till it falls; upon which the hunters from behind approaching, take up both, and reward the falcon with the blood of the spoil.

They sometimes also hunt these animals with the Ounce. This carnivorous and fierce creature being made tame and domestic, generally sits on horseback behind the hunter, and remains there with the utmost composure, until the ga-

ground. Instances have been known of some of these prodigious droves passing through flocks of sheep, and numbers of the latter carried along with the torrent, being lost to the owners, and becoming a prey to wild beasts. The African colonists can form no conception of the cause of the extraordinary appearance of these animals; and from their not being able to account for it, those who have not been eye-witnesses of such scenes consider their accounts as exaggerated; but an inspection of the country south of the Orange River solves the difficulty at once. The immense desert tracts between that river and the colony westward of the Zeekoe River, though destitute of permanent springs, and therefore uninhabitable by human beings for any length of time, are, notwithstanding, interspersed with stagnant pools, or natural reservoirs of brackish water, which, however bad, satisfies the game. In these endless plains, the spring-boks multiply, undisturbed by the hunter, except when occasionally the bushman destroys a few with his poisoned arrows, until the country literally swarms with them; when, perhaps, one year out of four or five, a lasting drought leaves the pools exhausted, and parches up the soil naturally inclined to sterility. This want, principally of water, drives those myriads of animals either to the Orange River, or to the colony, when they intrude in the manner above described."

The Elk Antelope is also an inhabitant of the Cape, as well as the greatest part of India, and is one of the larger kinds of antelopes. The elk antelopes live in plains and valleys; and when hunted, always run, if possible, against the wind. They are not very swift, and being in general fat—especially the males, which are always the largest of the herd—are soon tired. The hunter generally gets to the windward of the animal, which when he has accomplished, he takes an opportunity of throwing himself from his horse, and instantly shoots the flying game. The female has horns like the male, but smaller, which the Hottentots use for tobacco-pipes.

Besides these, there are the Wood Antelope, the Cervine Antelope, the Scythian Antelope, and the Gnu.

The Gnu may be added to the tribe of antelopes: it is the Hottentot name for a peculiar animal, which, with respect to its form, is somewhat between the horse and the ox. As the hyæna dog, or *wilde hond* of South America, connects the dog and wolf tribe with that of the hyæna, in like manner does the gnu form a graceful link between the buffalo and the antelope.

zelle is shown; it is then that it exerts all its arts and fierceness; it does not at once fly at its prey, but approaches slyly, turning and winding about until it comes within the proper distance, when all at once it bounds upon the heedless animal, and instantly kills it, and sucks its blood. If, on the other hand, it misses its aim, it rests in its place, without attempting to pursue any farther, but seems ashamed of its own inability.

Upon the whole, however, these animals, whatever be the arts used to pursue them, are very difficult to be taken. As they are continually subject to alarms from carnivorous beasts, or from man, they keep chiefly in the most solitary and inaccessible places, and find their only protection from situations of the greatest danger.*

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* View of the Animal Creation in the Interior of the Cape. — We would not interrupt the text, after the copious note quoted from Burchell's work on an interesting member of the animal kingdom at the Cape, the spring-bok; we insert here a view of the astonishing variety and fecundity of birds and beasts around that colony. Mr. Barrow says, "Upon the plains of the Sea-Cow River we fell in with spring-boks in countless troops, with hartebeests and bouté-boks. Quakkas from fifty to a hundred in a troop were hourly seen. The smaller kinds of game were also very plentiful. Hares were continually among the horses' feet. Of this animal are four known species in or near the colony, — the common hare, the Cape hare, the mountain hare, and the red-rumped hare. Of the last, the exterior part of the thighs and its long tail are of a deep chestnut colour, and the ears are much shorter than in the others. Cape partridges and the Namaqua grouse were equally plentiful. The latter is a gregarious bird, and we usually met with it in large coveys near all the springs of water. So little were they intimidated at the approach of our people, that they suffered themselves to be knocked down with whips and sticks. A new species of korhaen or bustard was also seen here; it appeared to be something like the tetrix or French field duck, but was so very wild and scarce that not one of them could be procured. The Egyptian black ibis (*Tantalus niger*) and another species of tantalus, called by the farmers the haddadas, were obtained at this place. The latter utter the most horrid screams that can be imagined. I believe it has not yet been described. The back is black; the ridge of the upper mandible, and the upper part of the toes, red; head, neck, and abdomen, cinereous blue; wing, and tail feathers, deep violet blue; back feathers green, edged with dusky brown; shoulders and covering feathers of the wings of a metallic lustre and iridescent. The mountain goose, the Egyptian goose, and the mountain duck were seen in considerable numbers. The last species answers to the description of the cana; but there seems to be a mistake in giving the white head to the male, which is found only in the female. Several other aquatic birds were met with about the Sea-Cow River, attracted thither, no doubt, by the vast quantities of fish that it contained. Of these, a species of *Cyprinus*, of a silvery colour, was the most common; and we caught also a species of *Silurus*. The most remarkable of the birds were the *Platalea leucorodia* or white spoonbill, the great white pelican, and the flamingo. We saw also the common crane (*Grus*), the Numidian crane (*Virgo*), and the heron (*cinerea*); the bald ibis (*calvus*), the Cape curlew, and the common coot

"In the neighbourhood of such places as are most frequented by graminivorous animals, the carnivorous tribe are, as might naturally be expected, the most abundant. The peasantry were, however, much surprised, that no more than one lion had been seen by the party, among the reedy banks of the Sea-cow River, a part of the country that has at all times been considered as particularly infested by this animal, and where they are also of a much larger size, as well as of a fiercer temper, than those of the lower parts of the colony The people of Sneuwberg are great sufferers from their frequent visits, particularly in their horses, to the flesh of which, after that of a Hottentot, the lion seems to give a decided preference. The farmers here have a kind of dog that is not afraid to attack a lion, and it is said that instances have occurred wherein two of these together have been able to destroy him. This domestic animal is as large, but not so strongly made, as the Newfoundland dog, of a dark cinereous brown, with black and ferruginous stripes, a long, straight tail; long, pendulous ears, and spurious toes on the hind legs. Of tigers, as they are called in the colony, the peasantry distinguish two sorts, the tiger of the mountains, and the tiger of the plains. Of the first, the upper part of the body and exterior parts of the legs are of a fallow ground, with irregular black spots, some circular, some lunated, and others ocellated; in some parts distinct, in others running together in clusters; the sides, belly, and interior parts of the legs, a white ground, with large, black, circular spots; upper part of the tail fulvous, with oblong black spots; under part barred across with alternate black and white bands vibrissæ or strong bristles about the mouth, silvery white; a black line along the fore part of the shoulders to the chest; length from the nose to the end of the tail seven feet four inches; length of the tail two feet ten inches. The description answers very nearly to that of the leopard, of which I believe it to be a variety only. The tiger of the plains is evidently of the same species, the only difference being in the size, which is a little larger than that of the former; and in the colour of the ground, which is a little lighter, both of which probably may arise from local circumstances. To another species of the feline tribe they give the name of leopard. It is not so long, but thicker, taller, and much stronger than those described above; the colour is cinereous, with small black spots; the neck and temples covered with long, crisp hair, like that of the mane of the lion; tail two feet, flat, vertical, spotted half way from the root, and the other half annulated; a thick black line from the interior angle of the eye extends to the opening of the mouth. Of this species we procured a young one; it became instantly tame, and as playful as the domestic kitten. Most beasts of prey, if taken young, may almost instantly be rendered tame. The fierce lion or the tiger is sooner reconciled to a state of domestication than the timid antelope; and the cadaverous crocuta, the wild dog, has lately been domesticated in the Sneuwberg, where it is now considered as one of the best hunters after game, and as faithful and diligent as any of the common sort of domestic dogs, yet in a state of nature there cannot possibly be a more savage animal.

"Birds as well as beasts of prey, are attracted to all such places as abounds with game. In the vicinity of the Sea-Cow River, vultures were more numerous than they had hitherto been seen in any part of the country. Of these we distinguished three sorts,—the large, black condor, the percnopterus, or Egyptian sacred vulture, and a third species, that seemed to differ from the second only in size, being no more than two feet long. The female also of this bird, as well as that of the percnopterus, is distinguished from the whitish coloured male by its plumage of dusky brown. This small species is called by the peasantry the white crow. The sacred scavenger of Egypt meets not here with that protection which was afforded it on the banks of the Nile, where, according to Herodotus, to destroy it was a capital crime. The percnopterus is a gregarious bird, and is usually seen in flocks that rarely consist of fewer than fifty; and they are generally attended with two or three condors, as many of the small white kind above mentioned, and a whole flock of the vulturine crow. An animal is no sooner shot than these birds appear hovering at an immense height in the air, from whence they plunge down the moment that the carcass is left alone. It has often been a subject of astonishment to me, from whence they could so instantaneously collect themselves in a body to souse upon their prey; but at the same time it convinced me of the accuracy of Pliny's observation, where he says that vultures are accustomed to hover about a place two or three days before the death of a diseased animal, and that they have a presentiment when and at what time a carcass will be found."—BARROW'S TRAVELS IN AFRICA.

(Chamois Hunters)

CHAP. VIII.

THE MUSK ANIMAL.

Musk Animal.

The more we search into nature, the more we shall find how little she is known; and we shall more than once have occasion to find, that protracted inquiry is more apt to teach us modesty, than to produce information. Although the number and nature of quadrupeds at first glance seems very little known; yet, when we come to examine closer, we find some with which we are very partially acquainted, and others that are utterly unknown.

Of all quadrupeds, there is none so justly the reproach of natural historians, as that which bears the musk. This perfume, so well known to the elegant, and so very useful in the hands of the physician, a medicine that has for more than a century been imported from the east in great quantities, and during all that time has been improving in its reputation, is nevertheless, so very little understood, that it remains a doubt whether the animal that produces it be a hog, an ox, a goat, or a deer.*

The musk which comes to Europe, is brought over in small bags, about the size of a pigeon's egg, which, when cut open, appear to contain a kind of dusky, reddish substance, like coagulated blood, and which, in large quantities, has a very strong smell; but when mixed and diffused, becomes a very agreeable perfume. Indeed, no substance now known in the world has a stronger and more permanent smell. A grain of musk perfumes a whole room; and its odour continues for some days, without diminution. But in a larger quantity it continues for years together; and seems scarce wasted in its weight, although it has filled the atmosphere to a great distance with its parts. It is particularly used in medicine, in nervous and hysteric disorders; and is found in such cases, to be the most powerful remedy now in use: however, the animal that furnishes this admirable medicine, has been very variously described, and is known but very imperfectly.

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* The Musk Tribe.—The musk is a family of quadrupeds whose form and manner have, till lately, remained in much obscurity. The number of species already known amounts to seven. They inhabit warm climates, and, like other mountain quadrupeds, wander in places the most difficult of access, are possessed of powers of great activity, and when pursued, take refuge among the highest summits. The well-known perfume called musk is contained in an oval receptacle, hardly as large as an egg, hanging from the middle of the abdomen, and is peculiar to the male. The species from which this is procured is the musk of Thibet—an animal about the size of a small roebuck, measuring about three feet three inches in length, and two feet three inches in height. The tail is so short, as to be hardly visible. The general colour is a deep iron gray. The ears are large, and the upper jaw is considerably longer than the lower, and is furnished on each side with an encurved tusk, extending nearly two inches beyond the mouth: these tusks are sharp-edged on their inner side.

The musk animals, (of which there are now ascertained to be six species,) are inhabitants, almost exclusively, of India and the Indian isles Two or three of the species are so small, as scarcely to exceed the rabbit size.

It is generally asserted, that when the musk-bag is first opened, so powerful an odour comes from it that every person present is obliged to cover his mouth and nose with several folds of linen; and that, notwithstanding this precaution, the blood will frequently gush from the nose. When the musk is fresh, a very small quantity is insupportable in a confined place: it causes giddiness in the head and hemorrhages, which have sometimes proved fatal. Besides the Thibetian, the other five are comprised under the names of the Indian, Guinea, Ceylon, Java, and Brazilian musk.

The description given of this animal by Grew, is as follows:—The musk animal is properly neither of the goat nor deer kind, for it has no horns, and it is uncertain whether it ruminates or not; however, it wants the fore-teeth in the upper jaw, in the same manner as in ruminating animals; but at the same time, it has tusks like those of a hog. It is three feet six inches in length, from the head to the tail; and the head is above a half a foot long. The fore part of the head is like that of a grey-hound; and the ears are three inches long, and erect, like those of a rabbit; but the tail is not above two inches. It is cloven-footed, like beasts of the goat kind; the hair on the head and legs is half an inch long, on the belly an inch and a half, and on the back and buttocks three inches, and proportionably thicker than in any other animal. It is brown and white alternately, from the root to the point; on the head and thighs it is brown, but under the belly and tail white, and a little curled, especially on the back and belly. On each side of the lower jaw, under the corners of the mouth, there is a tuft of thick air, which is short and hard, and about three quarters of an inch long. The hair, in general, of this animal, is remarkable for its softness and fine texture; but what distinguishes it particularly are the tusks, which are an inch and a half long, and turn back in the form of a hook; and more particularly the bag which contains the musk, which is three inches long, two broad, and stands out from the belly an inch and a half. It is a very fearful animal, and, therefore, it has long ears; and the sense of hearing is so quick, that it can discover an enemy at a great distance.

After so long and circumstantial a description of this animal, its nature is but very little known; nor has any anatomist as yet examined its internal structure; or been able to inform us whether it be a ruminant animal, or one of the hog kind; how the musk is formed, or whether those bags in which it comes to us be really belonging to the animal, or are only the sophistications of the venders. Indeed, when we consider the immense quantities of this substance which are consumed in Europe alone, not to mention the east, where it is in still greater repute than here, we can hardly suppose that any one animal can furnish the supply; and particularly when it must be killed before the bag can be obtained. We are told, it is true, that the musk is often deposited by the animal upon trees and stones, against which it rubs itself when the quantity becomes uneasy; but it is not in that form which we receive it, but always in what seems to be its own natural bladder. Of these, Taverner brought home near two thousand in one year; and as the animal is wild, so many must, during that space, have been hunted and taken. But as the creature is represented very shy, and as it is found but in some particular provinces of the east, the wonder is how its bag should be so cheap, and furnished in such great plenty.

Musk was some years ago in the highest request as a perfume, and but little regarded as a medicine; but at present its reputation is totally changed; and having been found of great benefit in physic, it is but little regarded for the purposes of elegance. It is thus that things which become necessary, cease to continue pleasing: and the consciousness of their use, destroys their power of administering delight.

CHAP. IX.

ANIMALS OF THE DEER KIND *

If we compare the stag and the bull as to shape and form, no two animals can be more unlike; and yet if we examine their internal structure, we shall find a striking similitude between them. Indeed, their differences, except to a nice observer, will scarcely be perceivable. All of the deer kind want the gall-bladder; their kidneys are formed differently; their spleen is also proportionably larger; their tail is shorter; and their horns, which are solid, are renewed every year. Such are the slight internal discriminations between two animals, one of which is among the swiftest, and the other the heaviest of the brute creation. The stag is one of those innocent and peaceable animals that seems made to embellish the forest, and animate the solitudes of nature.

Stag.

The stag, or Hart, whose female is called a *hind*, and the young a *calf*, differs in size and in horns from a fallow deer. He is much larger, and his horns are round; whereas in the fallow kind they are broad and palmated. By these the animal's age is known. The first year, the stag has no horns, but a horny excrescence, which is short, rough, and covered with a thin hairy skin. The next year the horns are single and straight; the third year they have two antlers, three the fourth, four the fifth, and five the sixth; this number is not always certain, for sometimes there are more and often less. When arrived at the sixth year, the antlers do not always increase; and, although the number may amount to six or seven on each side, yet the animal's age is then estimated rather from the size of the antlers and the thickness of the branch which sustains them, than from their variety.

These horns, large as they seem, are, notwithstanding, shed every year, and new ones come in their place. The old horns are of a firm, solid texture, and usually employed in making handles for knives and other domestic utensils. But, while young, nothing can be more soft or tender; and the animal, as if conscious of his own imbecility, at those times, instantly upon shedding his former horns, retires from the rest of his fellows, and hides himself in solitudes and thickets, never venturing out to pasture, except by night. During this time, which most usually happens in the spring, the new horns are very painful, and have a quick sensibility of any external impression. The flies also are extremely troublesome to him. When the old horn is fallen off, the new does not begin immediately to appear; but the bones of the skull are seen covered only with a transparent periosteum, or skin, which, as anatomists teach us, covers the bones of all animals. After a short time, however, this skin begins to swell, and to form a soft tumour, which contains a great deal of blood, and which begins to be covered with a downy substance that has the feel of velvet, and appears nearly of the same colour with the rest of the animal's hair. This tumour every day buds forward from the point like the graft of a tree; and, rising by degrees from the head, shoots out the antlers on either side, so that in a few days, in proportion as the animal is in condition, the whole head is completed. However, as was said above, in the beginning, its consistence is very soft, and has a sort of bark, which is no more than a continuation of the integument of the skull. It is velveted and downy, and every where furnished with blood vessels, that supply the growing horns with nourishment. As they creep along the sides of the branches, the print is marked over the whole surface; and the larger the blood vessels, the deeper these marks are found to be: from hence arises the inequality of the surface of the deer's horns; which, as we see, are furrowed all along the sides, the impressions diminishing towards the point, where the substance is as smooth and as solid as ivory. But it ought to be observed, that this substance, of which the horns is composed, begins to harden at the bottom while the upper part remains soft, and still continues growing; from whence it appears that the horns grow differently in deer from those of sheep or cows; in which they are always seen to increase from the bottom. However, when the whole head has received its full growth, the extremities then begin to acquire their solidity; the velvet covering, or bark, with its blood-vessels, dry up, and then begin to fall; and this the animal hastens, by rubbing its antlers against every tree it meets. In this manner the whole external surface being stripped off by degrees, at length the whole head acquires its complete hardness, expansion, and beauty.

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* The quadrupeds of this tribe have horns which are solid and branched; they are renewed every year, and when young are clothed with a fine, velvety, vascular skin, which falls off when the horns have attained their full size. In the lower jaw they have eight front teeth, and are generally destitute of canine teeth; but sometimes a single one is found on each side in the upper jaw. There are about fourteen distinct species. They are all extremely active, inhabiting chiefly woods and neglected situations; and in fighting, not only make use of their horns, but stamp furiously with the fore feet.

The beauty and size of the horns of the stag mark its strength and vigour; such of them as are sickly, or have been wounded, never shooting out that magnificent profusion so much admired in this animal. Thus the horns may, in every respect, be resembled to a vegetable substance, grafted upon the head of an animal. Like a vegetable they grow from the extremities; like a vegetable they are for awhile covered with a bark that nourishes them; like a vegetable they have their annual production and decay; and a strong imagination might suppose that the leafy productions on which the animal feeds go once more to vegetate in his horns. (g)

The stag is usually a twelvemonth old before the horns begin to appear, and then a single branch is all that is seen for the year ensuing. About the beginning of spring, all of this kind are seen to shed their horns, which fall off of themselves; though sometimes the animal assists the efforts of nature, by rubbing them against a tree. It seldom happens that the branches on both sides fall off at the same time, there often being two or three days between the dropping of the one and the other. The old stags usually shed their horns first, which generally happens towards the latter end of February, or the beginning of March.

(Axis Deer.)

As soon as the stags have shed their horns, they separate from each other, and seek the plainer parts of the country, remote from every other animal, which they are utterly unable to oppose. They then walk with their heads stooping down, to keep their horns from striking against the branches of the trees above. In this state of imbecility they continue near three months before their heads have acquired their full growth and solidity; and then, by rubbing them

(g Mr Buffon has something like this Vid passim.

against the branches of every thicket, they at length clear them of the skin which had contributed to their growth and nourishment. It is said by some that the horn takes the colour of the sap of the tree against which it is rubbed; and that some thus become red, when rubbed against the heath, and others brown, by rubbing against the oak; this, however, is a mistake, since stags kept in parks where there are no trees have a variety in the colour of their horns, which can be ascribed to nothing but nature.

A short time after they have furnished their horns, they begin to feel the impressions of the rut, or the desire of copulation. The old ones are the most forward; and about the end of August, or the beginning of September, they quit their thickets, and return to the mountain in order to seek the hind, to whom they call with a loud, tremulous note. At this time their neck is swollen; they appear bold and furious; fly from country to country; strike with their horns against the trees and other obstacles, and continue restless and fierce until they have found the female, who at first flies from them, but is at last compelled and overtaken. When two stags contend for the same female, how timorous soever they may appear at other times, they then seem agitated with an uncommon degree of ardour: they paw up the earth, menace each other with their horns, bellow with all their force; and, striking in a desperate manner against each other, seem determined upon death or victory. This combat continues till one of them is defeated or flies; and it often happens that the victor is obliged to fight several of those battles before it remains undisputed master of the field. The old ones are generally the conquerors upon these occasions, as they have more strength and greater courage; and these also are prefered by the hind to the young ones, as the latter are more feeble, and less ardent. However, they are all equally inconstant, keeping to the female but a few days, and then seeking out for another, not to be enjoyed, perhaps, without a repetition of their former danger.

In this manner the stag continues to range from one to the other for about three weeks, the time the rut continues—during which he scarce eats, sleeps, or rests, but continues to pursue, to combat, and to enjoy. At the end of this period of madness, for such in this animal it seems to be, the creature that was before fat, sleek, and glossy, becomes lean, feeble, and timid. He then retires from the herd, to seek plenty and repose; he frequents the side of the forest, and chooses the most nourishing pastures, remaining there till his strength is renewed. Thus is his whole life passed in the alternations of plenty and want—of corpulence and inanition—of health and sickness, without having his constitution much affected by the violence of the change. As he is above five years coming to perfection, he lives about forty years; and it is a general rule, that every animal lives about seven or eight times the number of years which it continues to grow.

The usual colour of the stag in England is red; nevertheless, the greater number in other countries are brown. There are some few that are white, but these seem to have obtained this colour in a former state of domestic tameness. Of all the animals that are natives of this climate, there are none that have such a beautiful eye as the stag: it is sparkling, soft, and sensible His senses of smelling and hearing are in no less perfection. When he is in the least alarmed, he lifts the head and erects the ears, standing for a few minutes as if in a listening posture. Whenever he ventures upon some unknown ground, or quits his native covering, he first stops at the skirt of the plain to examine all around; he next turns against the wind, to examine by the smell if there be any enemy approaching. If a person should happen to whistle or call out, at a distance, the stag is seen to stop short in his slow, measured pace, and gazes upon the stranger with a kind of awkward admiration; if the cunning animal perceives neither dogs nor fire-arms preparing against him, he goes forward, quite unconcerned, and slowly proceeds without offering to fly. Man is not the enemy he is most afraid of; on the contrary, he seems to be delighted with the sound of the shepherd's pipe, and the hunters sometimes make use of that instrument to allure the poor animal to his destruction.

The stag eats slowly, and is very delicate in the choice of his pasture. When he has eaten a sufficiency, he then retires to the covert of some thicket to chew the cud in security. His rummation, however, seems performed with much greater difficulty than with the cow or sheep; for the grass is not returned from the first stomach without much straining, and a kind of hiccup, which is easily perceived during the whole time it continues. This may proceed from the greater length of his neck and the narrowness of the passage, all those of the cow and sheep kind having it much wider.

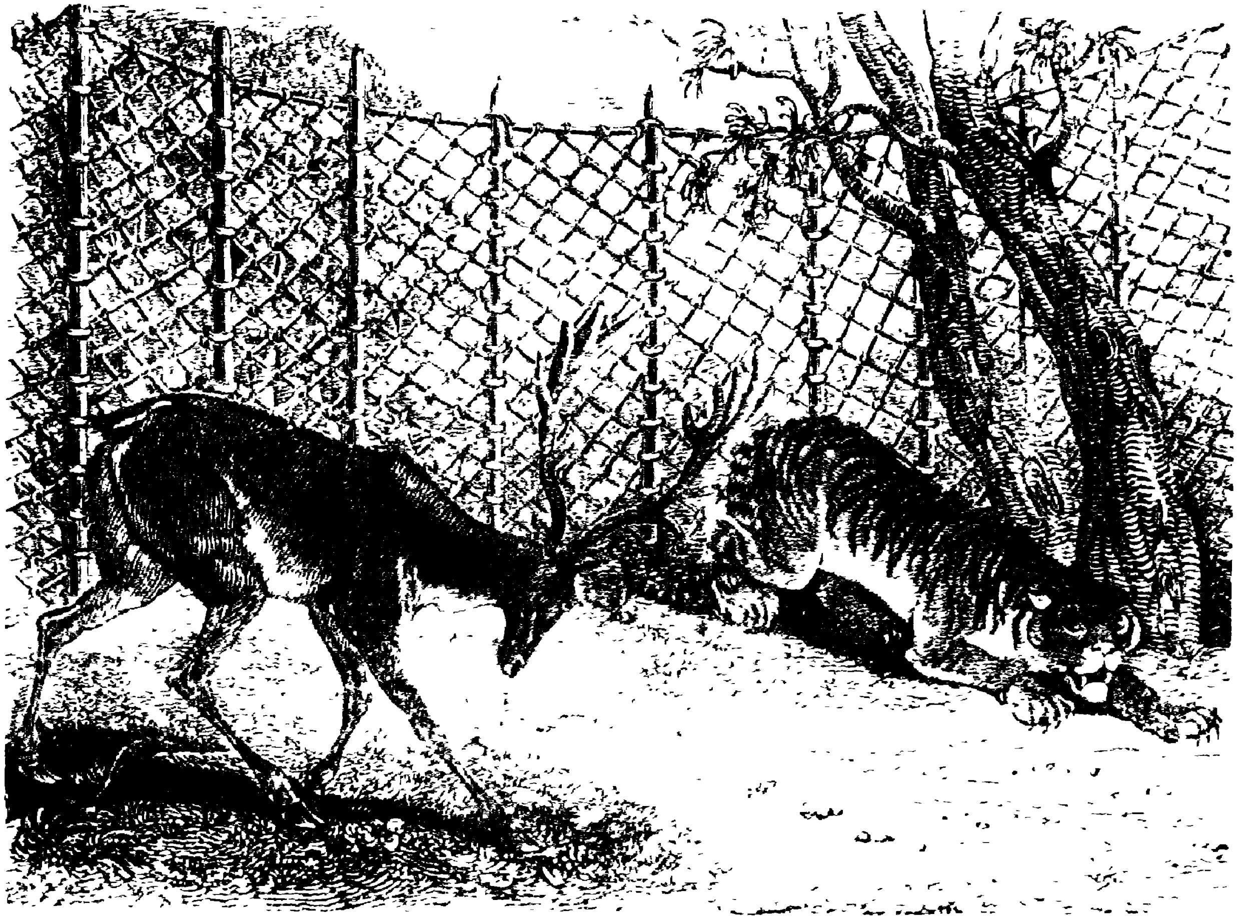
This animal's voice is much stronger, louder, and more tremulous in proportion as he advances in age: in the time of rut it is even terrible. At that season he seems so transported with passion, that nothing obstructs his fury; and when at bay, he keeps the dogs off with great intrepidity Some years ago, William, Duke of Cumberland caused a tiger and a stag to be inclosed in the same area; and the stag made so bold a defence, that the tiger was at last obliged to fly. The stag seldom drinks in the winter, and still less in the spring, while the plants are tender and covered over with dew. It is in the heat of summer, and during the time of rut, that he is seen constantly frequenting the side of rivers and lakes, as well to slake his thirst as to cool his ardour. He swims with great ease and strength, and best at those times when he is fatest, his fat keeping him buoyant, like oil upon the surface of the water. During the time of rut, he even ventures out to sea, and swims from one island to another, although there may be some leagues distance between them.

The cry of the hind, or female, is not so loud as that of the male, and is never excited but by apprehension for herself or her young. It need scarce be mentioned that she has no horns, or that she is more feeble or unfit for hunting than the male. When once they have conceived, they separate from the males, and then they both herd apart. The time of gestation continues between eight and nine months, and they generally produce but one at a time. Their usual season for bringing forth is about the month of May, or the beginning of June, during which they take great care to hide their young in the most obscure thickets. Nor is this precaution without reason, since almost every creature is then a formidable enemy: the eagle, the falcon, the osprey, the wolf, the dog, and all the rapacious family of the cat kind, are in continual employment to find out her retreat. But, what is more unnatural still, the stag himself is a professed enemy; and she is obliged to use all her arts to conceal her young from him as from the most dangerous of her pursuers. At this season, therefore, the courage of the male seems transferred to the female: she defends her young against her less formidable opponents by force; and when pursued by the hunter, she ever offers herself to mislead him from the principal object of her concern. She flies before the hounds for half the day, and then returns to her young, whose life she has thus preserved at the hazard of her own. The calf, for so the young of this animal is called, never quits the dam during the whole summer; and in winter, the hind, and all the males under a year old, keep together, and assemble in herds, which are more numerous in proportion as the season is more severe. In the spring they separate—the hinds to bring forth, while none but the year olds remain together. These animals are, however, in general fond of herding and grazing in company; it is danger or necessity alone that separates them.

The dangers they have to fear from other animals are nothing when compared to those from man. The men of every age and nation have made the chase of the stag one of their most favourite pursuits; and those who first hunted from necessity, have continued it for amusement. In our own country, in particular, hunting was ever esteemed as one of the principal diversions of the great. (g) At first, indeed, the beasts of chase had the whole island for their range, and knew no other limits than those of the ocean.

The Roman jurisprudence, which was formed on the manners of the first ages, established it as a law, that, as the natural right of things which have no master belongs to the first possessor, wild beasts, birds, and fishes, are the pro-

(g) British Zoology.



STAG ATTACKING A TIGER. P. 2[illegible]

perty of whosoever could first take them. But the northern barbarians, who overran the Roman empire, bringing with them the strongest relish for this amusement, and being now possessed of more easy means of subsistence from the lands they had conquered, their chiefs and leaders began to appropriate the right of hunting, and, instead of a natural right, to make it a royal one. When the Saxon kings, therefore, had established themselves into an heptarchy, the chases were reserved by each sovereign, for his own particular amusement. Hunting and war, in those uncivilized ages, were the only employment of the great: their active, but uncultivated, minds were susceptible of no pleasures but those of a violent kind—such as gave exercise to their bodies, and prevented the uneasiness of thinking. But as the Saxon kings only appropriated those lands to the business of the chase which were unoccupied before, so no individuals received any injury. But it was otherwise when the Norman kings were settled upon the throne; the passion for hunting was then carried to an excess, and every civil right was involved in general ruin. This ardour for hunting was stronger than the consideration of religion, even in a superstitious age. The village communities, nay, even the most sacred edifices, were thrown down, and all turned into one vast waste, to make room for animals, the object of a lawless tyrant's pleasure. Sanguinary laws were enacted to preserve the game; and in the reigns of William Rufus and Henry the First, it was less criminal to destroy one of the human species than a beast of chase. Thus it continued while the Norman line filled the throne; but when the Saxon line was restored, under Henry the Second, the rigour of the forest laws were softened. The barons also for a long time imitated the encroachments, as well as the amusements, of the monarch; but when property became more equally divided, by the introduction of arts and industry, these extensive hunting grounds became more limited; and as tillage and husbandry increased, the beasts of chase were obliged to give way to others more useful to community. Those vast tracts of land, before dedicated to hunting, were then contracted; and, in proportion as the useful arts gained ground, they protected and encouraged the labours of the industrious, and repressed the licentiousness of the sportsman.* In the present cultivated state of this country, therefore, the stag is unknown in its wild, natural state; and such of them as remain among us are kept, under the name of red deer, in parks among the fallow deer; but they are become less common than formerly. Its excessive viciousness during the rutting season, and the badness of its flesh, inducing most people to part with the species.

In England, the hunting the stag and the buck are performed in the same manner; the animal is driven from some gentleman's park, and then hunted through the open country.† But those who pursue the wild animal, have a much higher object, as well as a greater variety, in the chase. To let loose a creature that was already in our possession, in order to catch it again, is, in my opinion, but a poor pursuit, as the reward when obtained is only what we before had given away. But to pursue an animal that owns no proprietor, and which he that first seizes may be said to possess, has something in it that seems at least more rational; this rewards the hunter for his toil, and seems to repay his industry.

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* Ancient Britons. — Dio Nicaeus an ancient author, speaking of the inhabitants of the northern parts of this island, tells us they were a fierce and barbarous people, who tilled no ground, but lived upon the depredations they committed in the southern districts, or upon the food they procured by hunting. Strabo says also, that the dogs bred in Britain were highly esteemed upon the continent, on account of their excellent qualities for hunting; and these qualities, he seems to hint, were natural to them, and not the effect of tutorage by their foreign master. The information derived from the above cited authors does not amount to a proof that the practice of hunting was familiar with the Britons collectively; yet it certainly affords much fair argument in the support of such an opinion, for it is hardly reasonable to suppose that the pursuit of game should have been confined to the uncultivated northern freebooters, and totally neglected by the more civilized inhabitants of the southern parts of the island. We are well assured that venison constituted a great portion of their food; and as they had in their possession such dogs as were naturally prone to the chase, there can be little doubt that they would exercise them for the purpose of procuring their favourite diet; besides, they kept large herds of cattle and flocks of sheep, both of which required protection from wolves and other ferocious animals, that infested the woods and coverts, and must frequently have rendered hunting an act of absolute necessity.—Strutt's Sports and Pastimes.

† Stag Hunting.—This princely diversion has become almost extinct in this country. The state of the country does not now seem calculated for stag hunting. There are places at this time in England which

The chase is continued in many parts of the country where the red deer is preserved, and still makes the amusement of such as have not found out more

pass under the name of forests, but which are in a great measure *unforested*, and no longer afford shelter and protection to the deer tribe. In fact, the stag has been on the decline in this country for upwards of a century. In the parks of the great he has been for the most part supplanted by the fallow deer; while he is not to be found in a wild state in half a dozen places in England. He still roams at large in the Highlands of Scotland, though much reduced in number; and even in these parts he will, at no distant period, become as scarce as that beautiful, lesser animal, the roe-buck, which is now rarely seen, but which, an age or two back, was found in abundance, and not only animated, but gave a peculiar interest and beauty to the otherwise dreary scenery of this mountainous region. His late majesty George III. was much attached to stag-hunting, and for that purpose he had an excellent establishment, though the manner in which his majesty pursued the chase was scarcely entitled to the name of hunting. The hounds were fine looking dogs, and unquestionably well bred, so were the stags they pursued: they might be said to live together in harmony at Swinley, both dogs and game; and at certain periods the latter was brought from the place in a cart to a particular spot, and little better than a burlesque upon hunting ensued. When the deer was turned out, he was accompanied by two persons upon horseback, one on each side, whose business was to keep him constantly in view. After the lapse of a few minutes, the hounds were laid on the scent, and the chase commenced. The king and his attendants followed. The dogs ran swiftly, it must be allowed; but whenever they got to any distance, or out of sight of his majesty, they were stopped by the huntsman till he came up, and then the chase continued. In consequence of this arrangement, the chase could never be lost, or the hounds at fault; for, as the two persons who rode on each side the stag had him always in view, they could direct the huntsman in case of need, and, consequently, while this system rendered the chase an unerring pursuit, it extracted the very essence of hunting, by removing altogether those checks and uncertainties on which the pleasure almost depends—at least in the estimation of the true sportsman.

In Devonshire, wild deer are yet to be found, which are hunted in a regular, sportsmanlike manner; and at Wexford, in Huntingdonshire, in some extensive woodlands belonging to the Duke of Bedford and the Earl of Westmoreland, a few are still to be met with.

In a very old poem, hunting the stag is very accurately and very forcibly depicted; it is of the time of Charles II.—Ed.

At length the great and unexpected sound
Of dogs and men his wakeful ears does wound,
Rous'd with the noise, he scarce believes his ear,
Willing to think th' illusion of his fear
Had given the false alarm; but straight his view
Confirms that more than all his fears are true,
Betrayed in all his strength, the *wood beset,*
All instruments, all arts of ruin met:
He calls to mind his strength, and then his speed,
His winged heels, and then his armed head;
With those t'avoid, with this his fate to meet,
But fear prevails, and bids him trust his feet.

• • • • •

Now to the *stream*, when neither friends nor force,
Nor speed, nor art avail, he shapes his course,
Think not their *rage* so desperate to essay
An element more merciless than they:
But fearless they pursue, nor can the flood
Quench their dire thirst; alas! they thirst for blood,
As towards a ship the oar-finn'd gallies ply,
Which, wanting sea to ride, or wind to fly,
Stands but to fall revenged on those that dare
Tempt the last fury of extreme despair.
So fares the stag among th' enraged hounds,
Repels their force, and wounds return for wounds,
But vain's his strife; at last resigns his blood,
And stains the chrystal with a purple flood.

Distance a Deer will run.—Many years since, a stag was hunted from Whinfield Park, in the county of Westmoreland, until, by fatigue and accident, the whole pack was thrown out except two fox-hounds bred by Lord Thanet, who continued the chase during the greatest part of the day. The stag returned to the park whence he had been driven, and, as his last effort, leaped the wall, and died as soon as he had accomplished it. One of the hounds ran to the wall, but being unable to get over it, laid down, and almost instantly expired; the other hound was found dead about half a mile from the park. The length of the chase is uncertain; but, as they were seen at Redkirk, near Annan, Scotland, distant by the post road forty-six miles, it is conjectured that the circuitous course they took could not make the distance run less than *one hundred and twenty miles!*

liberal entertainments.* In those few places where the animal is perfectly wild, the amusement, as was said above, is superior. The first great care of the hunter, when he leads out his hounds to the mountain side, where the deer are generally known to harbour, is to make choice of a proper stag to pursue. His ambition is to unharbour the largest and the boldest of the whole herd; and for this purpose he examines the track, if there be any, which if he finds long and large, he concludes, that it must have belonged to a stag, and not a hind, the print of whose foot is rounder. Those marks also which he leaves on trees, by the rubbing of his horns, show his size, and point him out as the proper object of pursuit. Now to seek out a stag in his haunt, it is to be observed, that he changes his manner of feeding every month. From the conclusion of rutting time, which is November, he feeds in heaths and broomy places. In December they herd together, and withdraw into the strength of the forests, to shelter themselves from the severer weather, feeding on holm, elder trees, and brambles. The three following months they leave herding, but keep four or five in a company, and venture out to the corners of the forest, where they feed on winter pasture, sometimes making their incursions into the neighbouring corn fields, to feed upon the tender shoots, just as they peep above ground. In April and May they rest in thickets and shady places, and seldom venture forth, unless roused by approaching danger. In September and October their annual ardour returns; and then they leave the thickets, boldly facing every danger, without any certain place for food or harbour. When, by a knowledge of these circumstances, the hunter has found out the residence, and the quality of his game, his next care is to uncouple and cast off his hounds, in the pursuit: these no sooner perceive the timorous animal that flies before them, but they altogether open in full cry, pursuing rather by the scent than the view, encouraging each other to continue the chase, and tracing the flying animal with the most amazing sagacity. The hunters also are not less ardent in their speed on horseback, cheering up the dogs, and directing them where to pursue. On the other hand, the stag, when unharboured, flies at first with the swiftness of the wind, leaving his pursuers several miles in the rear: and at length having gained his former coverts, and no longer hearing the cries of the dogs and men that he had just left behind, he stops, gazes round him, and seems to recover his natural tranquillity. But this calm is of short duration, for his inveterate pursuers slowly and securely trace him along, and he once more hears the approaching destruction from behind. He again, therefore, renews his efforts to escape, and again leaves his pursuers at almost the former distance; but this second effort makes him more feeble than before, and when they come up a second time, he is unable to outstrip them with equal velocity. The poor animal now, therefore, is obliged to have recourse to all his little arts of escape, which sometimes, though but seldom avail him. In proportion as his strength fails him, the ardour of his pursuers is inflamed; he tracks more heavily on the ground, and this increasing the strength of the scent, redoubles the cries of the hounds, and enforces their speed. It is then that the stag seeks for refuge among the herd, and tries every artifice to put off some other head for his own. Sometimes he will send forth some little deer in his stead, in the mean time lying close himself, that the hounds may overshoot him. He will break into one thicket after another to find deer, rousing them, gathering them together, and endeavouring to put them upon the tracks he has made. His old companions, however, with a true spirit of ingratitude, now all forsake and shun him with the most watchful industry, leaving the unhappy creature to take his fate by himself. Thus abandoned of his fellows, he again tries other arts, by doubling and crossing in some hard beaten highway, where the scent is least perceivable. He now also runs against the wind, not only to cool himself, but the better to hear the voice, and judge of the distance of his implacable pursuers. It is now easily perceivable how sorely he is pressed, by his manner of running, which from the bounding easy pace with which he began, is converted into a stiff and short manner of going; his mouth also is black and dry, without foam on it; his tongue hangs out; and the tears, as some say, are seen starting from his eyes. His last refuge, when every other method of safety has failed him, is to take the water, and to attempt an escape by crossing whatever lake or river he happens to approach. While swimming, he takes all possible care to keep in the middle of the stream, lest, by touching the bough of a tree, or the herbage on the banks, he may give scent to the hounds. He is also ever found to swim against the stream; whence the huntsman have made it into a kind of proverb, *That he that would his chace find, must up with the river and down with the wind.* On this occasion too he will often cover himself under water, so as to show nothing but the tip of his nose. Every resource, and every art being at length exhausted, the poor creature tries the last remains of his strength, by boldly opposing those enemies he cannot escape; he, therefore, faces the dogs and men, threatens with his horns, guards himself on every side, and for some time stands at bay. In this manner, quite desperate, he furiously aims at the first dog or man that approaches; and it often happens that he does not die unrevenged.* At that time, the more prudent, both of the dogs and men, seem willing to avoid him; but the whole pack quickly coming up, he is soon surrounded and brought down, and the huntsman winds a *treble mort,* as it is called, with his horn.

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* THE GREAT HUNTINGS OF OLD.—All readers of border minstrelsy remember the ballad—

God prosper long our noble king,
Our lives and safeties all;
A woful hunting once there did,
In Chevy Chase befall

It is one of the most popular poems in our language.

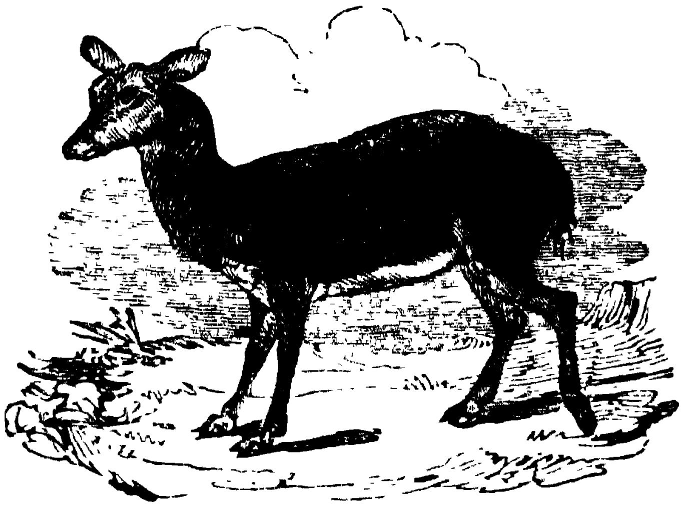
The union of the chase and war, was a natural alliance, for amongst a rude people personal prowess in the one, was the quality which most commanded success in the other

Gaston de Foix, occasionally one of the most triumphant, because one of the most cruel, treacherous, and altogether abominable heroes of the days of chivalry, was the mightiest hunter of his day. He is said to have kept sixteen hundred hounds, and he wrote a book on hunting.

The Scottish kings used to shoot the deer from an elevated seat as the packs were driven before them, a practice demanding as much enterprise, and altogether as rational, as what, in the terms of modern sporting, is called the *battue*. Pennant in his History of Scotland has described a scene of more danger; he has translated a passage from an old author, which illustrates in a graphic way, the ancient modes of hunting:—"One of the walks retains the name of the *King's seat*, having been the place where the Scottish monarchs placed themselves in order to direct their shafts with advantage at the flying deer, driven that way for their amusement A chase of this kind had very nearly prevented the future miseries of the unhappy Mary Stuart. The story is told by William Barclay; it gives a lively picture of the ancient manner of hunting

"In the year 1563, the Earl of Athol, a prince of the blood royal, had, with much trouble and vast expense, a hunting match for the entertainment of our most illustrious and gracious queen Our people called this a royal hunting. I was then a young man and present on that occasion. Two thousand Highlanders, or wild Scotch, as you call them here, were employed to drive to the hunting-ground all the deer from the woods and hills of Athol, Badenoch, Marr, Murray, and the counties about. As these Highlanders use a light dress, and are very swift of foot, they went up and down so nimbly, that, in less than two months' time, they brought together two thousand red deer, besides roes and fallow deer. The queen, the great men, and a number of others, were in a glen when all these deer were brought before them Believe me, the whole body moved forward in something like battle order The sight still strikes me, and ever will strike me, for they had a leader whom they followed close wherever he moved This leader was a very fine stag with a very high head. This sight delighted the queen very much, but she soon had cause for fear: upon the earl's—(who had been accustomed from his early days to such sights,)—addressing her thus; 'Do you observe that stag who is foremost of the herd? there is danger from that stag; for if either fear or rage should force him from the ridge of that hill, let every one look to himself, for none of us will be out of the way of harm; for the rest will follow this one, and, having thrown us under foot, they will open a passage to this hill behind us' What happened a moment after confirmed this opinion; for the queen ordered one of the best dogs to be let loose on one of the deer: this the dog pursues; the leading stag was frighted; he flies by the same way he had come there; the rest rush after him, and break out where the thickest body of Highlanders are; they had nothing for it but to throw themselves flat on the heath, and allow the deer to pass over them. It was told the queen that several of the Highlanders had been wounded, and that two or three had been killed outright; and the whole body had got off, had not the Highlanders, by their skill in hunting, fallen upon a stratagem to cut off the rear from the main body. It was of those that had been separated that the queen's dogs and those of the nobility made slaughter. There were killed that day three hundred and sixty deer with five wolves, and some roes"

Such is the manner of pursuing this animal in England; but every country has a peculiar method of its own, adapted either to the nature of the climate, or the face of the soil. The ancient manner was very different from that practised at present; they used their dogs only to find out the game, but not to rouse it. Hence they were not curious as to the music of their hounds, or the composition of their pack; the dog that opened before he had discovered his game, was held in no estimation. It was their usual manner silently to find out the animal's retreat, and surround it with nets and engines, then to drive him up with all their cries, and thus force him into the toils which they had previously prepared.



Muntjak

There are very few varieties in the red deer of this country; and they are mostly found of the same size and colour. But it is otherwise in different parts of the world, where they are seen to differ in form, in size, in horns and in colour.†

Although there are but few individuals of the deer kind, yet the race seems diffused over all parts of the earth. The new continent of America, in which neither the sheep, the goat, nor the gazelle, has been originally bred, nevertheless produces stags, and other animals of the deer kind, in sufficient plenty. The Mexicans have a breed of white stags in their parks, which they call stags royal.(g) The stags of Canada differ from ours in nothing except the size of the horns, which in them is greater; and the direction of the antlers, which rather turn back, than project forward, as in those of Europe. The same difference of size that obtains among our stags, is also to be seen in that country; and, as we are informed by Ruysch, the Americans have brought them into the same state of domestic tameness that we have our sheep, goats, or black cattle. They send them forth in the day-time to feed in the forests; and at night they return home with the herdsmen who guard them. The inhabitants have no other milk but what the hind produces; and use no other cheese but what is made from thence. In this manner we find, that an animal which seems made only for man's amusement, may be easily brought to supply his necessities. Nature has many stores of happiness and plenty in reserve, which only want the call of industry to be produced, and now remain as candidates for human approbation.

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* A wound from a stag's horn was deemed poisonous by our ancestors, as the old rhyme testifies—

> If thou be hurt with hart, it brings thee to thy bier,
> But barber's hand will boar's hurt heal, thereof thou needst not fear.

† **Present State of Red Deer in Great Britain.**—The quantity of deer in Great Britain has, of course, diminished with progress of agricultural improvement. During the last century numerous forests were inclosed in England, which were formerly filled with red and fallow-deer, and roe-bucks; which, existing in an almost wild state, tempted those who lived within their range to a constant life of depredation. What the deer stealers of the old times were, are the poachers now; and the temptation in either case, presents a fearful cause of crime and misery. There can be little doubt, that at one period of its history, probably when the surface, which is now morass or peat bog, or cleared and under tillage, was covered with forest, deer were abundant in most parts of Scotland. There were then probably a variety which is now extinct, for, in some of the bogs, horns are found of a larger dimension than any that are to be seen upon the present fallow-deer, or the red deer of the mountains. The red deer are now far from numerous, and are seldom, if ever, seen on the Grampians. This has, no doubt, arisen from the grazing of sheep and cattle, by which the seclusion the red deer are so fond of has been broken in upon, both in the mountains and in the valleys. As the more lucrative occupation of the soil extends into the remoter districts, the race must further and further decrease; nor is the period at which they will be wholly extinct, in all probability, very distant. Red deer are yet found in Mar Forest and Glenartney; and there are still a considerable number in Ross-shire,

(g) Buffon, vol. xii. p. 35.

though the extensive and judicious improvements, which have recently been effected under the Duke of Sutherland. have tended to their diminution. Now, unless by a person whom long observation has rendered familiar with their haunts, the country may be traversed without seeing even one. From their fleetness and the nature of the ground on which they are found, horses and hounds are of no use in the direct chase of them, as the steed would be required to leap precipices of fifty feet, instead of five-barred gates; and the dogs would be constantly tumbling into gullies and ravines, which are cleared by the deer at one bound. They cannot be driven "with hound and horn," as was the case in the days of the "barons bold," neither can they be collected and hemmed in, after the somewhat similar manner in which the Highland chiefs conducted their sports, as quoted in a former note. Still there are a few places where a person who has been habituated to the occupation, and who does not fear to ground himself in a morass, and will submit to the other pleasures of "stalking," may occasionally find a roe. The most certain time is when the state of the weather is such as to force the herds to the well-heads, where there is brushwood near to cover the marksman

The largest forest set apart for red deer which exists in Scotland, is the forest of Athol, where a hundred thousand English acres are given up to them; and upon this large track, neither man, woman, child, nor oxen, are allowed to trespass, with the exception of those parties who are permitted to partake of the mysteries of deer stalking. The sportsmen, seldom more than two in each party, set forth accompanied by a keeper who acts as general; and they are followed by two or three Highlanders, carrying spare rifles, and leading the deer-hounds The party is preceded by the keeper, who is about twenty or thirty yards in advance, attentively examining the face of every hill with his telescope, to discover the deer that may be grazing upon it Upon detecting a herd a counsel of war is held, and the plan of operations determined upon

It is necessary to proceed with much caution, as, independant of the strong sense of smelling, seeing, and hearing, which these animals are endued with, there is always one of the herd stationed as sentinel It frequently happens that a circuit of some miles is required to be made to get near them undetected. Having arrived as near as possible, the sportsmen, still concealed, fire, and continue firing and loading, as long as they remain within practicable distance Eleven out of a herd of fifteen have been known to be killed by one person: the accidental circumstance of an echo the wind being heard on one side and the flash seen on the other, so puzzled the deer, that they stood still, till the four last gathered courage and made off When wounded, large hounds, of a breed between the grey-hound and the blood-hound, are let loose upon the tract of their blood and they never leave it till they have brought the animal to bay

This is, of all European sports, the most noble and interesting as any person who has tried and understands it will testify, heightened as it is by the beauty and wildness of the mountain scenery, the pure and invigorating effect of the air the picturesque dress and appearance of the Highlanders and the eager interest they take in a pursuit, so peculiar to their native hills, and so congenial to their habits

Wapiti

THE FALLOW-DEER.—No two animals can be more nearly allied than the stag and the fallow-deer. (g)* Alike in form, alike in disposition, in the superb furniture of their heads, in their swiftness and timidity; and yet no two animals keep more distinct, or avoid each other with more fixed animosity. They are never seen to herd in the same place, they never engender together, or form a mixed breed; and even in those countries where the stag is common, the buck seems to be entirely a stranger. In short, they both form distinct families; which, though so seemingly near, are still remote; and although with the same habitudes, yet retain an unalterable aversion.

Fallow-Deer.

The fallow-deer, as they are much smaller, so they seem of a nature less robust, and less savage than those of the stag kind. They are found but rarely wild in the forests; they are, in general, bred up in parks, and kept for the purposes of hunting, or of luxury, their flesh being prefered to that of any other animal. It need scarce be mentioned, that the horns of the buck make its principal distinction, being broad and palmated; whereas those of the stag are in every part round. In the one, they are flatted and spread like the palm of the hand; in the other they grow like a tree, every branch being of the shape of the stem that bears it. The fallow-deer also has the tail longer, and the hair lighter than the stag, in other respects, they pretty nearly resemble one another.

The head of the buck, as of all other animals of this kind, is shed every year, and takes the usual time for repairing. The only difference between it and the stag is, that this change happens later in the buck; and its rutting time, consequently falls more into the winter. It is not found so furious at this season as the former; nor does it so much exhaust itself by the violence of its ardour. It does not quit its natural pastures in quest of the female, nor does it attack other animals with indiscriminate ferocity: however, the males combat for the female among each other; and it is not without many contests, that one buck is seen to become master of the whole herd

It often happens also, that a herd of fallow-deer is seen to divide into two parties, and engage each other with great ardour and obstinacy.(g) They both seem desirous of gaining some favourite spot of the park for pasture, and of driving the vanquished party into the coarser and more disagreeable parts. Each of these factions has its particular chief; namely, the two oldest and

THE WAPETI.—This is a stag of North America, and resembles the common stag in nearly all his proportions, but his size is far superior, being at the shoulder from four feet four, to four feet eight inches; the superiority of bulk being chiefly in the magnitude of body.

In the mountainous parts of Hircania, Russia, and Siberia, is found a species of deer something larger than the roe-buck The colour is brown, with the outsides of the limbs, and under parts of the body yellowish. It has no tail, but a mere broadish excrescence.

* THE FALLOW-DEER, is smaller than the stag; of a brownish bay colour, whitish beneath, on the insides of the limbs, and beneath the tail. The horns which are peculiar to the male, are very different from those of the stag; they are not properly branched, but are broader towards the upper part, and divided into processes down the outside. A simple antler rises from the base of each, and a similar one at some distance from the first.

(g) Buffon, vol xii. p 36.

(g) Ibid.

strongest of the herd. These lead on to the engagement; and the rest follow under their direction. These combats are singular enough, from the disposition and conduct which seems to regulate their mutual efforts. They attack with order, and support the assault with courage; they come to each other's assistance, they retire, they rally, and never give up the victory upon a single defeat. The combat is renewed for several days together; until at length the most feeble side is obliged to give way, and is content to escape to the most disagreeable part of the park, where only they can find safety and protection.

The fallow-deer is easily tamed, and feeds upon many things which the stag refuses. By this means it preserves its venison better; and even after rutting, it does not appear entirely exhausted. It continues almost in the same state through the whole year, although there are particular seasons when its flesh is chiefly in esteem. This animal also browzes closer than the stag; for which reason it is more prejudicial among young trees, which it often strips too close for recovery. The young deer eat much faster and more greedily than the old; they seek the female at their second year, and, like the stag, are fond of variety. The doe goes with young above eight months, like the hind; and commonly brings forth one at a time: but they differ in this, that the buck comes to perfection at three, and lives till sixteen; whereas the stag does not come to perfection till seven, and lives till forty.*

The manner of hunting the buck is pretty much the same as that of stag hunting, except that less skill is required in the latter. The buck is more easily roused; it is sufficient to judge by the view, and mark what grove or covert it enters, as it is not known to wander far from thence; nor, like the stag, to change his *layer*, or place of repose. When hard hunted, it takes to some strong hold or covert with which it is acquainted, in the more gloomy parts of the wood, or the steeps of the mountain; not like the stag, flying far before the hounds, nor crossing nor doubling, nor using any of the subtleties which the stag is accustomed to. It will take the water when sorely pressed, but seldom a great river; nor can it swim so long, nor so swiftly as the former. In general, the strength, the cunning and the courage of this animal, are inferior to those of the stag; and, consequently, it affords, neither so long, so various, nor so obstinate a chase: besides, being lighter, and not tracking so deeply, it leaves a less powerful and lasting scent, and the dogs in the pursuit are more frequently at a fault.

As the buck is a more delicate animal than the stag, so also is it subject to greater varieties.(*g*) We have in England two varieties of the fallow-deer, which are said to be of foreign origin. The beautiful spotted kind, which is supposed to have been brought from Bengal; and the very deep brown sort, that are now so common in several parts of this kingdom. These were introduced by king James the First, from Norway: for having observed their hardiness, and that they could endure the winter, even in that severe climate, without fodder, he brought over some of them into Scotland, and disposed of them among his chases.* Since that time, they have multiplied in many parts of the British empire; and England is now become more famous for its venison, than any other country in the world. Whatever pains the French have taken to rival us in this particular, the flesh of their fallow-deer, of which they keep but a few, has neither the fatness nor the flavour of that fed upon English pasture.

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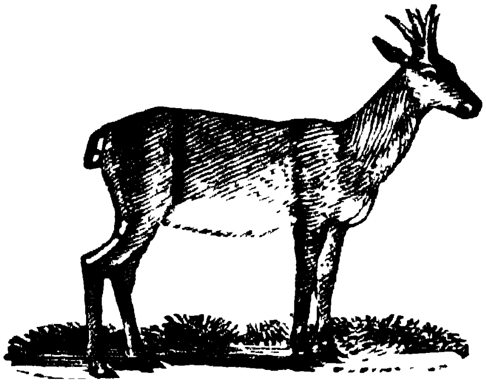
* Peculiar Provision of Nature.—The fallow-deer is known to bring forth from one to three at a time, and lives till about twenty. When these animals drink, they plunge their noses, like some horses, very deep under water, and continue in that situation for some time; "but to obviate any inconveniences," says White, in his Natural History of Selborne, "they can open two vents, one at the inner corner of each eye, which has a communication with the nose. Here seems to be an extraordinary provision of nature, worthy our attention; for it appears as if these creatures would not be suffocated, though both their mouth and nostrils were stopped. This curious formation of the head may be of singular service to beasts of chase, by affording them free respiration; and no doubt these additional nostrils are thrown open when they are hard run." Pennant observed something analogous to this in the antelope. This animal has a long slit beneath each eye, which can be opened and shut at pleasure. On holding an orange to one, the creature made the same use of these orifices as of his nostrils; applying them to the fruit, and seeming to smell it through them.

We may remark on the above, the testimony of Mr. Shaw, fifty years game-keeper and keeper of the Earl of Derby's stags, at Knowsley-park, which goes to contradict this. He maintains that these slits have no communication whatever with the nose, nor is it easy to ascertain for what purpose they are designed. When the animal is irritated, they are opened and distended to the utmost; they are frequently found to contain a mucous discharge, as if the defluxions from the eyes and head were thus carried off.—Ed.

(*g*) British Zoology.



Roe-buck

THE ROE-BUCK.—The roe-buck is the smallest of the deer kind known in our climate, and is now almost extinct among us, except in some parts of the Highlands of Scotland. It is generally about three feet long, and about two feet high. The horns are from eight to nine inches long, upright, round, and divided into only three branches. The body is covered with very long hair, well adapted to the rigour of its mountainous abode. The lower part of each hair is ash-colour; near the ends is a narrow bar of black, and the points are yellow. The hairs on the face are black, tipped with ash colour. The ears are long, their insides of a pale yellow, and covered with long hair.† The spaces bordering on the eyes and mouth, are black. The chest, belly and legs, and the inside of the thighs, are of a yellowish white; the rump is of a pure white, and the tail very short. The make of this little animal is very elegant; and its swiftness equals its beauty. It differs from the fallow-deer, in having round horns, and not flatted like theirs. It differs from the stag, in its smaller size, and the proportionable paucity of its antlers; and it differs from all of the goat kind, as it annually sheds its head, and obtains a new one, which none of that kind are ever seen to do.

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* Fallow-Deer in Scotland at Present.—Fallow-deer are abundant in Scotland in the present day, not only in inclosed parks, but at large, over the country. They are found in many of the woodland plantations in Forfar and Perthshire; which seems to indicate, that a restoration of the woods would lead to an increase of their numbers. Those that are found in the situations alluded to, have, no doubt, been produced by individuals which had escaped from the parks. In summer they are not often seen; but when the winter is severe, they sometimes invade the cottage gardens, in troops of six or eight together.

In a state approaching that of nature they are most plentiful in the central part of the Grampians, from which it is probable that they may extend their numbers into all those mountainous districts, where planting has been prefered to grazing. They are most numerous on the southern part of the bleak, naked ridge of Miningly. The greater part of this ridge is the property of the Duke of Athol, although many deer are found on the Duke of Gordon's lands, towards the east. The deer are seldom on the summits, but generally in the glens of the Tilt and Bruar. Those deer are often seen in herds of upwards of a thousand; and when in a tract where there is no human abode for twenty or thirty miles, a long line of bucks appear on a height with their branching horns relieved upon the clear mountain sky, the sight is very imposing. During the rutting season, the deer are in the fastnesses of the glens.

Anecdote.—A game-keeper having shot a deer, hit but did not kill him; it fled into the heart of the forest, where the game-keeper lost sight of him. Convinced that he had not missed his mark, and that the deer must sooner or later fall, he followed his track, but he had to traverse the forest for a long time before he saw anything of the deer. At length he heard a distant groaning in the thicket; he quickened his pace, and discovered the wounded animal at some distance, stretched upon the ground. He was just about to fire a second time, when he saw two other deer run up to the wounded one. His curiosity being excited, he stopped to observe without being himself seen by them. As soon as the wounded deer saw his friends, he moaned in a louder and more impressive voice. The two others began to lick his wounds, and as long as they licked the wounded deer was silent, for it seemed to afford relief. The game-keeper shot a second time, and hit it in the heart.

† There are two varieties of colour, one very red, and the other yellowish brown grey; there is even a third, nearly black, in Hanover, but all have a white disk upon the buttocks,

As the stag frequents the thickest forests, and the sides of the highest mountains, the roe-buck, with humbler ambition, courts the shady thicket and the rising slope. Although less in size and far inferior in strength to the stag, it is yet more beautiful, more active, and even more courageous. Its hair is always smooth, clean, and glossy; and it frequents only the driest places, and of the purest air. Though but a very little animal, as we have already observed, yet, when its young is attacked, it faces even the stag himself, and often comes off victorious. (*g*) All its motions are elegant and easy; it bounds without effort, and continues the course with but little fatigue. It is also possessed of more cunning in avoiding the hunter, is more difficult to pursue, and, although its scent is much stronger than that of the stag, it is more frequently found to make good a retreat. It is not with the roe-buck, as with the stag, who never offers to use art until his strength is beginning to decline; this more cunning animal, when it finds that its first efforts to escape are without success, returns upon its former tract, again goes forward, and again returns, until by its various windings it has entirely confounded the scent, and joined the last emanations to those of its former course. It then, by a bound, goes to one side, lies flat upon its belly, and permits the pack to pass by very near, without offering to stir.*

But the roe-buck differs not only from the stag in superior cunning, but also in its natural appetites, its inclinations, and its whole habits of living. Instead of herding together, these animals live in separate families; the sire, the dam, and the young ones, associate together, and never admit a stranger into their little community. All others of the deer kind are inconstant in their affection; but the roe-buck never leaves its mate; and as they have been generally bred up together, from their first fawning, they conceive so strong an attachment, the male for the female, that they never after separate. Their rutting season continues but fifteen days—from the latter end of October to about the middle of November. They are not at that time, like the stag, overloaded with fat; they have not that strong odour which is perceived in all others of the deer kind; they have none of those furious excesses; nothing, in short, that alters their state: they only drive away their fawns upon these occasions—the buck forcing them to retire, in order to make room for a succeeding progeny. However, when the copulating season is over, the fawns return to their does, and remain with them some time longer; after which, they quit them entirely, in order to begin an independent family of their own. The female goes with young but five months and a half; which alone serves to distinguish this animal from all others of the deer kind, that continue pregnant more than eight. In this respect, she rather approaches more nearly to the goat kind; from which, however, this race is separated by the male's annual casting its horns.

When the female is ready to bring forth, she seeks a retreat in the thickest part of the woods, being not less apprehensive of the buck, from whom she then separates, than of the wolf, the wild cat, and almost every ravenous animal of the forest. She generally produces two at a time, and three but very rarely. In about ten or twelve days these are able to follow their dam, except in cases of warm pursuit, when their strength is not equal to the fatigue. Upon such occasions, the tenderness of the dam is very extraordinary: leaving them in the deepest thickets, she offers herself to the danger, flies before the hounds, and does all in her power to lead them from the retreat where she has lodged her little ones. Such animals as are nearly upon her own level she boldly encounters: attacks the stag, the wild cat, and even the wolf, and while she has life continues her efforts to protect her young. Yet all her endeavours are often vain; about the month of May, which is her fawning time, there is a greater destruction among those animals than at any other season of the year. Numbers of the fawns are taken alive by the peasants; numbers are found out, and worried by the dogs; and still more by the wolf, which has always been their most inveterate enemy. By these continual depredations upon this beautiful creature, the roe-buck is every day becoming scarcer; and the whole race in many countries is wholly worn out.

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* Evasion.—Some years ago, a roe-buck, after being hunted out of Scotland, through Cumberland, and various parts of the North of England, at last took refuge in the woody recesses bordering upon the banks of the Tyne, between Prudhoe Castle and Wylam. It was repeatedly seen and hunted, but no dogs were equal to its speed. It frequently crossed the river; and, either by swiftness or artifice, eluded all its pursuers. It happened, during the rigour of a severe winter, that being pursued, it crossed the river upon the ice with some difficulty; and being much strained by its violent exertions, was taken alive. It was kept for some weeks in the house, and was then again turned out; but all its cunning and activity were gone; it seemed to have forgotten the places of its former retreat; and after running for some time, it lay down in the middle of the brook, where it was killed by the dogs.

(*g*) Buffon, Vol. xii. p. 75.

The fawns continue to follow the deer eight or nine months in all; and upon separating, their horns begin to appear, simple and without antlers the first year, as in those of the stag kind; (*g*) these they shed at the latter end of autumn, and renew during the winter; differing in this from the stag, who sheds them in spring, and renews them in summer. When the roe-buck's head is completely furnished, it rubs the horns against trees in the manner of the stag, and thus strips them of the rough skin and the blood-vessels, which no longer contribute to their nourishment and growth. When these fall, and new ones begin to appear, the roe-buck does not retire as the stag to the covert of the wood, but continues its usual haunts, only keeping down its head to avoid striking its horns against the branches of trees, the pain of which it seems to feel with exquisite sensibility. The stag, who sheds his horns in summer, is obliged to seek a retreat from the flies, that at that time greatly incommode him; but the roe-buck, who sheds them in winter, is under no such necessity; and, consequently, does not separate from its little family, but keeps with the female all the year round. (*g*)

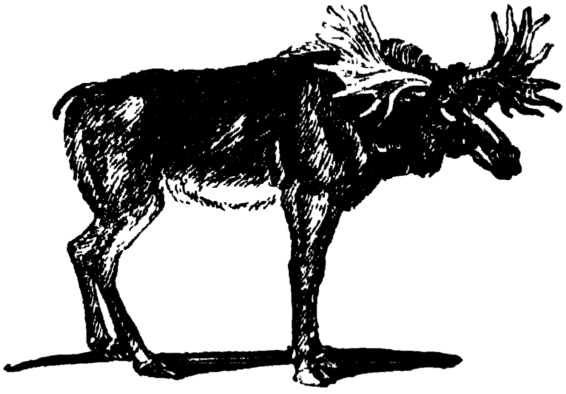
As the growth of the roe-buck, and its arrival at maturity, is much speedier than that of the stag, so its life is proportionably shorter. It seldom is found to extend above twelve or fifteen years, and if kept tame it does not live above six or seven. It is an animal of a very delicate constitution, requiring variety of food, air, and exercise. It must be paired with a female, and kept in a park of at least a hundred acres. They may easily be subdued, but never thoroughly tamed. No arts can teach them to be familiar with the feeder, much less attached to him. They still preserve a part of their natural wildness, and are subject to terrors without a cause. They sometimes, in attempting to escape, strike themselves with such force against the walls of their inclosure, that they break their limbs, and become utterly disabled. Whatever care is taken to tame them, they are never entirely to be relied on, as they have capricious fits of fierceness, and sometimes strike at those they dislike with a degree of force that is very dangerous.

The cry of the roe-buck is neither so loud nor so frequent as that of the stag. The young ones have a particular manner of calling to the dam, which the hunters easily imitate, and often thus allure the female to her destruction. Upon some occasions, also, they become in a manner intoxicated with their food, which, during the spring, is said to ferment in their stomachs, and they are then very easily taken. In summer they keep close under covert of the forest, and seldom venture out, except in violent heats, to drink at some river or fountain. In general, however, they are contented to slake their thirst with the dew that falls on the grass and the leaves of trees, and seldom risk their safety to satisfy their appetite. They delight chiefly in hilly grounds, prefering the tender branches and buds of trees to corn or other vegetables; and it is un-

(*g*) Buffon, vol. xii. p 88.

(*g*) Ibid.

versally allowed that the flesh of those between one and two years old is the greatest delicacy that is known.



The Elk.

THE ELK.*—We have hitherto been describing minute animals in comparison of the elk; the size of which, from concurrent testimony, appears to be equal to that of the elephant itself. It is an animal rather of the buck than the stag kind, as its horns are flatted towards the top; but it is far beyond both in stature, some of them being known to be above ten feet high. It is a native both of the old and new continent, being known in Europe under the name of the elk, and in America by that of the moose-deer. It is sometimes taken in the German and Russian forests, although seldom appearing; but it is extremely common in North America, where the natives pursue, and track it in the snow.† The

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[*] According to Buffon, the elk was unknown to the Greeks; and the word *alce* first occurs in the writings of Julius Cæsar, and was probably adopted by him from the *Celtæ*. Its *Celtic* name is elch; and Swedish, ælg.

[†] THE ELK is a native of Europe, America, and Asia as far as Japan. In summer time, the elks frequent the margins of rivers and lakes, getting into the water in order to avoid musquitoes. They are often killed by the Indians while they are crossing rivers, or swimming from the mainland to islands. When pursued in this situation, they are the most inoffensive of all animals, never making any resistance; and the young ones are so simple, that in North America, Mr. Hearne saw an Indian paddle his canoe up to one of them, and taking it by the pole without the least opposition; the poor, harmless animal seeming at the same time as contented as if swimming by the side of its dam, and looking up in the faces of those who were about to become its murderers, with the most fearless innocence.

Elks are the easiest to tame and domesticate of any kind of deer. They will follow their keeper to any distance from home; and at his call will return to him, without the least trouble, and without even attempting to deviate from the path. An Indian, at the factory in Hudson's Bay, had, in the year 1777, two of them so tame, that when he was on his passage to Prince of Wales' Fort, in a canoe, they always followed him along the bank of the river; and at night, or any other occasion, when he landed, they generally came and fondled on him in the same manner as the most domestic animal would have done, and never attempted to stray from the tents. He did not, however, possess these animals long; for he one day crossed a deep bay in one of the lakes, in order to save a very circuitous route along its banks, and expected the creatures would, as usual, follow him round; but unfortunately, at night they did not arrive; and as the howling of wolves was heard in the quarter they were, it is supposed they were devoured by them.

ITS SAGACITY.—UTILITY.—M. D'Osbonville had a moose-deer in his possession, while in the East Indies. He procured it when only ten or twelve days old, and kept it about two years without ever tying it up. He even let it run abroad, and sometimes amused himself with making it draw in the yard, or carry little burdens. It always came when called; and he found few signs of impatience, except when it was not always allowed to remain near him. When he departed from the island of Sumatra, he gave it to Mr. Law, of Lauceston, the governor-general, an intimate friend. This gentleman sent it to his country house, where, being kept alone, and chained, it became so furious as not to be approached without danger. "After some months absence," says M. D'Osbonville, "I returned; it knew me afar off; and as I observed the efforts it made to get to me, I ran to meet it; and never shall I forget the impression which the caresses and transports of this faithful animal made upon me.

An attempt has been made at New York to render the elk useful in agriculture, which has been attended with success. Mr. Livingston, President of the New York Society, had two of these animals broken in harness. Though they had only been twice bitted, and were two years old, they appeared to be equally docile with colts of the same age. They applied their whole strength to the draught, and went on a steady pace. Their mouths appeared very tender, and some care was necessary to prevent them from being accounts of this animal are extremely various; some describing it as being no higher than a horse, and others above twelve feet high.

As the stature of this creature makes its chief peculiarity, so it were to be wished that we could come to some precision upon that head. If we were to judge of its size by the horns, which are sometimes fortuitiously dug up in many parts of Ireland, we should not be much amiss in ascribing them to an animal at least ten feet high. One of these I have seen, which was ten feet nine inches from one tip to the other.

The European elk grows to above seven or eight feet high. In the year 1742, there was a female of this animal shown at Paris, which was caught in a forest of Red Russia, belonging to the Cham of Tartary.(*g*) It was then but young, and its height was even at that time six feet seven inches; but the describer observes, that it has since become much taller and thicker; so that we may suppose this female at least seven feet high. There have been no late opportunities of seeing the male; but by the rule of proportion, we may estimate his size at eight or nine feet at the least, which is about twice as high as an ordinary horse. The height, however, of the female, which was measured, was but six feet seven inches, Paris measure, or almost seven English feet high. It was ten feet from the tip of the nose to the insertion of the tail, and eight feet round the body. The hair was very long and coarse, like that of a wild boar; the ears resembled those of a mule, and were a foot and a half long. The upper jaw was longer, by six inches, than the lower; and, like other ruminating animals, it had no teeth—(cutting teeth I suppose the describer means). It had a large beard under the throat, like a goat; and in the middle of the forehead, between the horns, there was a bone as large as an egg. The nostrils were four inches long on each side of the mouth. It made use of its fore feet as a defence against its enemies. Those who showed it asserted that it ran with astonishing swiftness; that it swam also with equal expedition, and was very fond of the water. They gave it thirty pounds of bread every day, beside hay, and it drank eight buckets of water. It was tame and familiar, and submissive enough to its keeper.

This description differs in many circumstances from that which we have of the moose, or American elk, which the French call the original. Of these there are two kinds, the common light grey moose, which is not very large; and the black moose, which grows to an enormous height.

The grey moose-deer is about the size of a horse; and although it has large buttocks, its tail is not above an inch long. As in all of this kind the upper lip is much longer than the under, it is said that they continue to go backward as they feed. Their nostrils are so large that a man may thrust his hand in a considerable way; and their horns are as long as those of a stag, but, as was observed, much broader.

The black moose is an enormous animal. Josseyln, who is the first English writer that mentions it, says, that it is a goodly creature, twelve feet high, with exceeding fair horns, that have broad palms, two fathoms from the top of one horn to another. He assures us, that it is a creature, or rather a monster of superfluity, and many times bigger than an English ox.

These animals delight in cold countries,* feeding upon grass in summer, an

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injured by the bit. If upon trial it is found that elks can be rendered useful in harness, it will be a considerable acquisition to America. As their trot is very rapid, it is probable that, in light carriages, they would outtravel the horse. They are less delicate in their food, becoming fat on hay only. They are long-lived, and more productive than any beasts of burden.

* The Elk in Norway and Sweden.—Mr. Lloyd, in his narrative of a residence in Sweden, says, "Though it was an uncommon circumstance for elks to be seen in the vicinity of Lapp Cottage, they were rather abundant in the part of the country of which I am now speaking. During the past summer and autumn, indeed, Mattsson stated they had been unusually plentiful; and, as a proof of it, he said that at the first setting in of the winter, forty-seven of these animals, as was seen by their tracks in the snow, had crossed the pathway leading from Tryssild

(*g*) Dictionnaire Raisonnée des Animaux. Au Nom, Elan.

the bark of trees in winter. When the whole country is deeply covered with snow, the moose-deer herd together under the tall pine-trees, strip off the bark, and remain in that part of the forest while it yields them subsistence. It is at that time that the natives prepare to hunt them, and particularly when the sun begins to melt the snow by day, which is frozen again at night; for then the icy crust which covers the surface of the snow is too weak to support so great a

to Elverum, which was in the vicinity of his residence, a distance of between twenty and thirty miles; and to have faced in a northerly direction for a line of country where they were in the habit of passing that inclement period of the year.

These noble animals, the pride of the Scandinavian wilds, were formerly found in many other parts of Europe, where the species is now altogether extinct. They were common to the forests of Germany, as well as of Gaul.

The elk was at one time numerous in most parts of Sweden and Norway; but owing to the increased population, and other causes, it is now only to be met with in particular districts. In Scania, the most southern province of Sweden, where they once abounded, there are now none to be found. "The elk cannot endure," says Nellsson, a Swedish naturalist, "so cold a climate as the stag, the sixty-fourth degree of latitude being the extreme limit at which he is met with in the Scandinavian Peninsula. The elk is sometimes of an enormous size; though his length be not proportionate, it is said, he not unfrequently attains to the height of seven or eight feet. This I can readily believe, as Mr Wise, the Swedish consul-general, had one in his possession a few years ago, which, though only two years of age, measured nearly nineteen hands, or upwards of six feet at the shoulder. I once took the exact dimensions of a rather large male elk that I shot: but, unfortunately, I lost the measuring-string out of my pocket. Though this animal was not fully grown, it was thought he weighed near one thousand pounds. The male is very much larger than the female.

The period of gestation with the elk is about nine months; the female brings forth, about the middle of May, from one to three young ones; it is seldom, however, that she has more than two. At this period, the mother retires alone to the wildest recesses of the forest. After the lapse of two or three days, the fawns, which are of a light brown colour, have sufficient strength to follow their dam everywhere. They keep with her until they are in their third year, when she leaves them to shift for themselves. The elk is a long-lived animal; he does not attain to his full growth until after his fourteenth year: at least, so it is to be presumed, as up to that period his horns, which are of a flat form, are annually provided with an additional branch. He sheds his horns about the month of February in each year. The female elk has no horns.

By nature, the elk is timorous, and he usually flies at the sight of a man. In the rutting season, however, like other animals, he is said to be dangerous. His weapons are his horns and his hoofs: he strikes so forcibly with the latter, as to annihilate a wolf, or other large animal, at a single blow. It is said, that when the elk is incensed, the hair on his neck bristles up like the mane of a lion, which gives him a wild and frightful appearance.

In the summer season, the elk usually resorts to morasses and low situations, for he frequently takes to the water in warm weather; he is an admirable swimmer. In the winter, he retires to the more sheltered parts of the forest, where willow, ash, &c. are to be found; as, from the small boughs of these trees, he obtains his sustenance during that inclement period of the year.

The flesh of the elk is excellent, whether fresh or smoked. Mr. Nellsson says it resembles in taste that of the stag. The tongue and the nose are thought to be great delicacies in Scandinavia, as well as in America. Great virtue was once placed in the hoof of the animal, as parings of it were supposed to be a specific against the falling sickness and other disorders; this idle notion is exploded. The skin is convertible to many purposes, and is very valuable. Mr Greiff says—"It is not long since that a regiment was clothed with buff waistcoats, made from the hides of those animals, which were so thick, that a ball could scarcely penetrate them." He adds further, that, "when made into breeches, a pair of them, among the peasantry of former days, went as a legacy for several generations." The elk is easily domesticated. Formerly, these animals were made use of in Sweden, to draw sledges; but owing, as it was said, to their speed frequently accelerating the escape of people who had been guilty of murders or other crimes, the use of them was prohibited, under great penalties.

The usual manner in which these animals are killed is something curious. With his well-trained dog in a long leash, the sportsman proceeds to those parts of the forest frequented by the elk: whilst traversing this, he halts occasionally, to give his dog the wind. This the intelligent animal seems perfectly to understand; for, holding up his nose, he snuffs the passing breeze. When, bulk, and only retards the animal's motion. When the Indians, therefore, perceive a herd of these at a distance, they immediately prepare for their pursuit, which is not, as with us, the sport of an hour, but is attended with toil, difficulty, and danger. (*g*) The timorous animal no sooner observes its enemies approach than it immediately endeavours to escape, but sinks at every step it takes. Still, however, it pursues its way through a thousand obstacles; the snow, which is usually four feet deep, yields to its weight, and embarrasses its speed; the sharp ice wounds its feet; and its lofty horns are entangled in the branches of the forest, as it passes along. The trees, however, are broken down with ease; and wherever the moose deer runs, it is perceived by the snapping off the branches of trees, as thick as a man's thigh, with its horns. The chase lasts in this manner for the whole day; and sometimes it has been known to continue for two, nay, three days together; for the pursuers are often not less excited by famine than the pursued by fear. Their perseverance, however, generally succeeds; and the Indian who first comes near enough darts his lance, with unerring aim, which sticks in the poor animal, and at first increases its efforts to escape. In this manner the moose trots heavily on, (for that is its usual pace,) till its pursuers once more come up, and repeat their blow. Upon this, it again summons up sufficient vigour to get a-head; but at last, quite tired, and spent with loss of blood, it sinks, as the describer expresses it, like a ruined building, and makes the earth shake beneath its fall.*

This animal, when killed, is a very valuable acquisition to the hunters. The flesh is very well tasted, and said to be very nourishing. The hide is strong, and so thick, that it has been often known to turn a musket-ball: however, it is soft and pliable, and, when tanned, the leather is extremely light, yet very

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therefore, the dog has got scent of the elk, which I have seen him do from a long distance, the sportsman allows him, though still in the leash, to draw upon the animal, and follows after as quickly as he is able. When the dog has approached to within a short distance of the elk, he evinces, by his anxiety, that his game is not far distant. The man now proceeds with every deliberation and caution. That his movements may be effected with the greater silence, he generally ties his dog to a tree, who is too well trained to give tongue in the absence of his master, and alone reconnoitres the surrounding country. Thus the man not unfrequently succeeds in getting a view of the elk, either whilst lying down or feeding, and of slaughtering him with his rifle. Much more commonly, nevertheless, the elk, from his exquisite sense of smelling, takes the alarm, and goes off at the top of his speed. It is not difficult to pursue the same elk for a day or two together, as owing to his holding principally to the morasses and low ground in the summer season, his track is in most places perceptible. Hard blowing weather is the best for the purpose, as the noise made among the trees by the wind prevents the elk from hearing the approach of the hunter; the scent is then breast high, and the dog, in consequence, is enabled to take a man in a direct line up to the game. The rutting season, which commences about the latter end of August, and continues throughout September, is the best time to shoot the elk; the exquisite sense of smelling possessed by these animals is then said to be, in some degree, impaired; and from being engaged in their amours, they are the more easy of access.

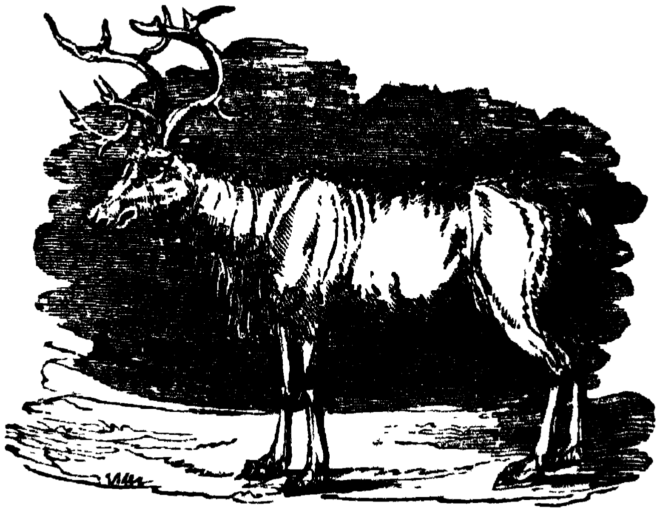
* Hunting the Elk in Canada.—The methods of hunting the elk in Canada are curious. The first and most simple is, before the lakes and rivers are frozen, multitudes of the natives assemble in their canoes, with which they form a vast crescent, each point touching the shore; whilst another party on the shore surrounds an extensive tract. They are attended by dogs, which are let loose, and press towards the water with loud cries. The animals, alarmed by the noise, fly before the hunters, and plunge into the lake, where they are killed by the people in the canoes, with lances and clubs. Another method requires a greater degree of preparation and art: the hunters inclose a large space with sticks and branches of trees, forming two sides of a triangle. The bottom opens into a second inclosure, which is fast on all sides; at the opening are hung numbers of snares, made of the slips of raw hides. They assemble as before in great troops; and with all kinds of hideous noises drive into the inclosure not only moose, but various other kinds of deer, with which the country abounds. Some, in forcing their way through the narrow pass, are caught in the snares by the neck or horns; whilst those who escape these meet their fate from the arrows of the hunters, directed at them from all quarters.

(*g*) Phil. Trans. vol. ii. p. 436.

lasting. The fur is a light grey in some, and blackish in others; and, when viewed through a microscope, appears spongy like a bulrush, and is smaller at the roots and points than in the middle; for this reason it lies very flat and smooth, and though beaten or abused never so much, it always returns to its former state. The horns also are not less useful, being applied to all the purposes for which hartshorn is beneficial.

After all, this animal is but very indifferently and confusedly described by travellers, each mixing his account with something false or trivial—often mistaking some other quadruped for the elk, and confounding its history. Thus, some have mistaken it for the rein-deer, which in everything but size it greatly resembles; some have supposed it to be the same with the Tapurette, (*g*) from which it entirely differs; some have described it as the common red American stag, which scarcely differs from our own; and, lastly, some have confounded it with the bubalus, which is more properly a gazelle of Africa. (*g*)

THE REIN-DEER.—Of all animals of the deer kind, the Rein-deer is the most extraordinary and the most useful. It is a native of the icy regions of the north; and though many attempts have been made to accustom it to a more southern climate, it shortly feels the influence of the change, and in a few months declines and dies. Nature seems to have fitted it entirely to answer the necessities of that hardy race of mankind that live near the pole. As these would find it impossible to subsist among their barren, snowy mountains without its aid, so this animal can live only there, where its assistance is most absolutely necessary. From it alone the natives of Lapland and Greenland supply most of their wants; it answers the purposes of a horse, to convey them and their scanty furniture from one mountain to another; it answers the purposes of a cow, in giving milk; and it answers the purposes of the sheep, in furnishing them with a warm, though a homely kind of clothing. From this quadruped alone, therefore, they receive as many advantages as we derive from three of our most useful creatures;—so that Providence does not leave these poor outcasts entirely destitute, but gives them a faithful domestic, more patient and serviceable than any other in nature.



(Rein-Deer.)

The rein-deer resembles the American elk in the fashion of its horns. It is not easy in words to describe these minute differences; nor will the reader, perhaps, have a distinct idea of the similitude, when told that both have brow-antlers, very large, and hanging over their eyes, palmated towards the top, and bending forward, like a bow.* But here the similitude between these two animals ends; for, as the elk is much larger than the stag, so the rein-deer is much smaller. It is lower and stronger built than the stag; its legs are shorter and thicker, and its hoofs much broader than in that animal; its hair is much thicker and warmer; its horns much larger in proportion, and branching forward over its eyes; its ears are much larger; its pace is rather a trot than a bounding, and this it can continue for a whole day; its hoofs are cloven and movable, so that it spreads them abroad as it goes, to prevent its sinking in the snow. When it proceeds on a journey, it lays its great horns on its back, while there are two branches which always hang over its forehead, and almost cover its face. One thing seems peculiar to this animal and the elk—which is, that as they move along, their hoofs are heard to crack with a pretty loud noise. This arises from their manner of treading; for as they rest upon their cloven hoof, it spreads on the ground, and the two divisions separate from each other; but when they lift it, the divisions close again, and strike against each other with a crack. The female also of the rein-deer has horns, as well as the male,—by which the species is distinguished from all other animals of the deer kind whatsoever.

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* HORNS.—In the elk the horns are stemless, or branched from the base; in the rein-deer the horns are round, bent back, and palmated at the extremities. In length they are generally two feet eight inches, and from tip to tip, two feet five; they weigh nine pounds.

It should seem, both from its situation and form, an excellent instrument to remove the snow, under which their favourite moss lies.

(*g*) Condamine. (*g*) Dapper, Description de l'Afrique, p. 17.

When the rein-deer first shed their coat of hair, they are brown; but, in proportion as summer advances, their hair begins to grow whitish, until, at last, they are nearly grey. (*g*) They are, however, always black about the eyes. The neck has long hair hanging down, and coarser than upon any other part of the body. The feet, just at the insertion of the hoof, are surrounded with a ring of white. The hair in general stands so thick over the whole body, that if one should attempt to separate it, the skin will no where appear uncovered; whenever it falls also, it is not seen to drop from the root, as in other quadrupeds, but seems broken short near the bottom; so that the lower part of the hair is seen growing, while the upper falls away.

The rein-deer, as was said, is naturally an inhabitant of the countries bordering on the arctic circle. In Lapland, this animal is converted to the utmost advantage; and some herdsmen of that country are known to possess above a thousand in a single herd.*

Lapland is divided into two districts, the mountainous and the woody. The mountainous part of the country is at best barren and bleak, excessively cold, and uninhabitable during the winter; still, however, it is the most desirable part of this frightful region, and is most thickly peopled during the summer. The natives generally reside on the declivity of the mountains, three or four cottages together, and lead a cheerful and a social life. Upon the approach of winter, they are obliged to migrate into the plains below, each bringing down his whole herd, which often amounts to more than a thousand, and leading them where the pasture is in greatest plenty. The woody part of the country is much more desolate and hideous. The whole face of nature there presents a frightful scene of trees without fruit, and plains without verdure. As far as the eye can reach, nothing is to be seen, even in the midst of summer, but barren fields, covered only with a moss, almost as white as snow; no grass, no flowery landscapes, only here and there a pine-tree, which may have escaped the frequent conflagrations by which the natives burn down their forests. But what is very extraordinary, as the whole surface of the country is clothed in white, so, on the contrary, the forests seem to the last degree dark and gloomy. While one kind of moss makes the fields look as if they were covered with snow, another kind blackens over all their trees, and even hides their verdure. This moss, however, which deforms the country, serves for its only support, as upon it alone the rein deer can subsist.* The inhabitants, who during the summer, lived among the mountains, drive down their herds in winter, and people the plains and woods below. Such of the Laplanders as inhabit the woods and the plains all the year round, live remote from each other, and having been used to solitude, are melancholy, ignorant and helpless. They are much poorer also than the mountaineers, for, while one of those is found to possess a thousand rein-deer at a time, none of these are ever known to rear the tenth part of that number. The rein-deer make the riches of this people; and the cold, mountainy parts of the country agree best with its constitution. It is for this reason, therefore, that the mountains of Lapland are prefered to the woods; and that many claim an exclusive right to the tops of hills covered in almost eternal snow.

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* THE REIN-DEER IN GREAT BRITAIN.—An attempt was made about seven years ago to introduce the rein-deer, upon an extensive scale, in the colder parts of England and Scotland. Many persons will remember Mr. Bullock's exhibition of rein-deer and a Lapland family. Out of two hundred deer, which were brought by him from Norway, nearly every one died. Those that were turned out upon the Pentland Hills, near Edinburgh, a situation which was peculiarly favourable, all died. A few appeared to do well in a park near Dublin. The Duke of Athol had previously placed a herd of rein-deer in the mountains of his estate, but the experiment did not succeed. The circumstance is not to be attributed to the want of proper food, for the rein-deer moss is found abundantly in Scotland. It grows, too, in many parts of England, particularly on Bagshot Heath.—But the same ill success has attended the introduction of the larger species of deer, which belong to the new continent. Several fine species of the Wapeti, an American deer, were turned out into Windsor Park a few years ago: none of them lived more than a year.

Whether these trials have failed through a want of proper attention to the peculiar habits of the animal, or that they naturally result from the tenacity with which the deer tribe adhere to their original geographical position, as a law of nature, is a question yet to be decided.—ED.

(*g*) For the greatest part of this description of the rein-deer, I am obliged to Mr. Hoffberg, upon whose authority, being a native of Sweden, and an experienced naturalist, we may confidentially rely.

As soon as the summer begins to appear, the Laplander who had fed his rein-deer upon the lower grounds, during the winter, then drives them up to the mountains, and leaves the woody country, and the low pasture, which at that season are truly deplorable. The gnats, bred by the sun's heat, in the marshy bottoms, and the weedy lakes, with which the country abounds more than any other part of the world, are all upon the wing, and fill the whole air, like clouds of dust in a dry windy day. The inhabitants, at that time, are obliged to daub their faces with pitch, mixed with milk, to shield their skins from their depredations. All places are then so greatly infested, that the poor natives can scarce open their mouths without fear of suffocation; the insects enter, from their numbers and minuteness, into the nostrils and the eyes, and do not leave the sufferer a moment at his ease. But they are chiefly enemies to the rein-deer . the horns of that animal being then in their tender state, and possessed of extreme sensibility, a famished cloud of insects instantly settle upon them, and drive the poor animal almost to distraction. In this extremity, there are but two remedies, to which the quadruped, as well as its master, are obliged to have recourse. The one is, for both to take shelter near their cottage, where a large fire of tree moss is prepared, which filling the whole place with smoke, keeps off the gnat, and thus, by one inconvenience, expels a greater; the other is, to ascend to the highest summit of the mountains, where the air is too thin, and the weather too cold, for the gnats to come. There the rein-deer are seen to continue the whole day, although without food, rather than to venture down into the lower parts, where they can have no defence against their unceasing persecutors.

Besides the gnat, there is also a gadfly, that, during the summer season, is no less formidable to them. This insect is bred under their skins, where the egg has been deposited the preceding summer; and it is no sooner produced as a fly, than it again endeavours to deposit its eggs in some place similar to that from whence it came. Whenever, therefore, it appears flying over a herd of rein-deer, it puts the whole body, how numerous soever, into motion; they know their enemy, and do all they can, by tossing their horns, and running among each other, to terrify or avoid it. All their endeavours, however, are too generally without effect; the gadfly is seen to deposit its eggs, which burrowing under the skin, wound it in several places, and often bring on an incurable disorder.

In the morning, therefore, as soon as the Lapland herdsman drives his deer to pasture, his greatest care is to keep them from scaling the summits of the mountains where there is no food, but where they go merely to be at ease from the gnats and gadflies that are ever annoying them. At this time, there is a strong contest between the dogs and the deer; the one endeavouring to climb up against the side of the hill, and to gain those summits that are covered in eternal snows; the other, forcing them down, by barking and threatening, and, in a manner, compelling them into the places where their food is in the greatest plenty. There the men and dogs confine them; guarding them with the utmost precaution the whole day, and driving them home at the proper seasons for milking.

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* Food.—The rein-deer feeds also on frogs, snakes, and even on the mountain rat; often pursuing the latter to such a great distance, as not to be able to find its way home again.

The female brings forth in the middle of May, and gives milk till about the middle of October. Every morning and evening, during the summer, the herdsman returns to the cottage with his deer to be milked, where the women previously have kindled up a smoky fire, which effectually drives off the gnats, and keeps the rein-deer quiet while milking. The female furnishes about a pint, which, though thinner than that of the cow, is, nevertheless, sweeter and more nourishing. This done, the herdsman drives them back to pasture; as he neither folds nor houses them, neither provides for their subsistence during the winter, nor improves their pasture by cultivation.

Upon the return of the winter when the gnats and flies are no longer to be feared, the Laplander descends into the lower grounds; and, as there are but few to dispute the possession of that desolate country, he has an extensive range to feed them in. Their chief and almost their only food at that time, is the white moss already mentioned; which, from its being fed upon by this animal, obtains the name of the *lichen rangiferinus.* This is of two kinds: the woody lichen, which covers almost all the desert parts of the country like snow; the other is black, and covers the branches of the trees in very great quantities. However unpleasing these may be to the spectator, the native esteems them as one of his choicest benefits, and the most indulgent gift of nature. While his fields are clothed with moss, he envies neither the fertility nor the verdure of the more southern landscape; dressed up warmly in his deer-skin clothes, with shoes and gloves of the same material, he drives his herds along the desert; fearless and at ease, ignorant of any higher luxury than what their milk and smoke-dried flesh afford him. Hardened to the climate, he sleeps in the midst of ice; or awaking, dozes away his time with tobacco; while his faithful dogs supply his place, and keep the herd from wandering. The deer, in the mean time, with instinct adapted to the soil, pursue their food, though covered in the deepest snow. They turn it up with their noses, like swine; and even though its surface be frozen and stiff, yet the hide is so hardened in that part, that they easily overcome the difficulty. It sometimes, however, happens, though but rarely, that the winter commences with rain, and a frost ensuing, covers the whole country with a glazed crust of ice. Then, indeed, both the rein-deer and the Laplander are undone; they have no provisions laid up in case of accident, and the only resource is to cut down the large pine-trees, that are covered with moss, which furnishes but a scanty supply; so that the greatest part of the herd is then seen to perish, without a possibility of assistance. It sometimes also happens, that even this supply is wanting; for the Laplander often burns down his woods, in order to improve and fertilize the soil which produces the moss, upon which he feeds his cattle.

The rein-deer of this country are of two kinds, the wild and the tame. The wild are larger and stronger, but more mischievous than the others. Their breed, however, is prefered to that of the tame; and the female of the latter is often sent into the woods, from whence she returns home impregnated by one of the wild kind. These are fitter for drawing the sledge, to which the Laplander accustoms them betimes, and yokes them to it by a strap, which goes round the neck, and comes down between their legs. The sledge is extremely light, and shod at the bottom, with the skin of a young deer, the hair turned to slide on the frozen snow. The person who sits on this guides the animal with a cord, fastened round the horns, and encourages it to proceed with his voice, and drives it with a goad.*

In order to make these animals more obedient, and more generally serviceable, they castrate them; which operation the Laplanders perform with their teeth; these become sooner fat when taken from labour; and they are found to be stronger in drawing the sledge. There is usually one male left entire for every six females; these are in rut from the feast of St. Matthew to about Michaelmas. At this time, their horns are thoroughly burnished, and their battles among each other are fierce and obstinate. The females do not begin to breed till they are two years old; and then they continue regularly breeding every year till they are superannuated. They go with young above eight months, and generally bring forth two at a time. The fondness of the dam for her young is very remarkable; it often happens that when they are separated from her, she will return from pasture, keep calling round the cottage for them, and will not desist until, dead or alive, they are brought and laid at her feet. They are at first of a light brown; but they become darker with age; and at last the old ones are of a brown almost approaching to blackness. The young follow the dam for two or three years; but they do not acquire their full growth until four. They are then broken in, and managed for drawing the sledge; and they continue serviceable for four or five years longer. They never live above fifteen or sixteen years; and, when they arrive at the proper age, the Laplander generally kills them for the sake of their skins and their flesh. This he performs by striking them on the back of the neck, with his knife, into the spinal marrow: upon which they instantly fall, and he then cuts the arteries that lead to the heart, and lets the blood discharge itself into the cavity of the breast.†

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* Power of Scent.—"In proceeding along the extensive and endless lakes of Lapland, if the number of deer be great, a close and lengthened procession is invariably formed; each deer following the foremost sledge so closely, that the head of the animal is generally in contact with the shoulders of the driver before. Should the guide alter his direction, by making a bend to the right or left, the whole of the deer in the rear will continue their course till they arrive at the spot where the turn was made. It thus frequently happens, that when the distance between the foremost and hindmost deer is great, on the guide making a bend, considerable saving might be obtained by cutting across. This however it is scarcely possible to do; for should the deer even be pulled by main force out of its former course, it will immediately turn aside from the new direction it is placed in, and regain the old track in spite of all the driver can do to prevent it. It is useless to contend with the animal; and the time thus lost might leave the driver at such a distance from the rest of the party as to render it a matter of extreme difficulty to overtake them. This unwillingness to separate from its companions, is one feature of the instinct given to this animal; and it is the very circumstance that, more than any other, insures the safety of the traveller. Should any accident separate him from the rest of his party, the deer be fatigued, or other circumstance throw him considerably in the rear, if he trust entirely to his deer, it will enable him to overtake the rest, though they should be some miles in advance, from the exquisite olfactory sense it possesses. The animal in this case, holding its head close to the snow, keeps frequently smelling, as a dog would do to scent the footsteps of its master, and is thus enabled to follow with certainty the track the other deer have gone. Were it not for this property of the animal, travelling across Lapland, would not be a little hazardous, particularly in those parts where the weather is the darkest, which is generally while crossing the mountains of Finmark. It often happens that the party is unavoidably scattered, and the sound of the bells enables them to rejoin each other. The bells, however, should the weather be very thick and stormy, can only be heard a short distance off; and it is then by the sagacity of the deer alone, that the difficulty is surmounted."—Capell Brooke's "Winter in Lapland."

† Habits of the Rein-Deer.—I took a walk round the island with the dogs, but saw nothing; I was also attended by my young deer, which is now perfectly tame,—and I shall here make some remarks on those animals. Notwithstanding rein-deer are very wild and timorous, yet no creature is so soon or so effectually tamed if taken young. They not only grow very bold, but also show great affection for such men and dogs as they take a liking to, and have a great spite against

There is scarce any part of this animal that is not converted to its peculiar uses. As soon as it begins to grow old, and some time before the rut, it is

those who affront them. The deer of mine has had its full liberty ever since the fourth day after it was caught (except a few nights confinement in the crib, lest the dog should kill it when we were all asleep); but since then it has continually lain out. It is not in the least alarmed at any noise, not even at the report of a gun fired close to it; but it is much terrified if any dogs run after or near it, and any running of the people instantly affrights it; but the moment all is quiet, it is so too. It will often go up to a dog, and smell to him; it is well acquainted with all mine, and will lie down by the fire amongst them. I believe they scarce ever sleep, for as much as I have watched this, I never could observe that it was ever asleep, or kept its eyes closed more than two minutes at a time; and if I moved ever so little, it would start up. When I have lain down on the bed, at a time when it was lying on the floor, it would start up every five or six minutes, and come to see that I was not gone; and having licked my face, or sucked my neckerchief a little, it would lie quietly down again. When at any time it lost me, it would run about, grunting somewhat like a hog, and never rest until it found me, when it would run up to me at full speed. Sometimes I have diverted myself with stooping and running, both after and from it, which pleased it much; and it would do the same, and frisk about in the same manner as I have seen the wild calves one among another: I have likewise observed, that whenever it is frightened, it erects its single (tail), which at all other times hangs down.

It is a mistaken notion that they will not eat grass, or scarcely anything but white moss; for they will eat every kind of vegetable, which this country naturally produces. Rein-deer do not seem to relish grass much, yet I have seen mine eat a little, and it generally prefered the coarsest kinds. I have often observed that, in the latter end of April, and in the month of May, the wild ones eat little else besides dry grass and wild rye, which then appears through the snow. They affect great variety in their food, while things are in a growing state; prefering the youngest and most juicy. This causes them to vary their food every month, and also several times in the same day, according as it is moist or dry; rejecting now, what an hour ago they prefered to every thing else. The leaves of the dogberry bush when young, and a tender plant which grows by the hill sides on moist ground, resembling cross lettuce, as also a succulent aquatic plant which grows in ponds, all these they devour most greedily. There is a small pond near this house which is full of the latter, and this deer of mine has eaten it close down to the water. I think I have seen the same kind of plant in the Highlands of Scotland, and is what they use in their beer instead of hops. They also delight to eat the young leaves of most sorts of trees and shrubs which have not a resinous juice, particularly the willow; but I have known them eat the outer shoots of the black spruce in the winter time, though but sparingly. I most wonder that they are not fond of vetches, which grow in abundance here. I have often tracked the wild ones through large beds of them, without observing that they cropped any; yet I have seen mine eat a few sometimes. This will eat a little of the crumb of soft bread, but will scarcely touch crust or biscuit. Pudding and boiled potatoes it is very fond of, but will not eat the latter raw; it will also eat boiled meat.

They are very sure footed, for they will run along the shore, over sharp, rough rocks, or smooth, round, loose stones, without ever stumbling or slipping; but on smooth ice they can with difficulty stand. They are beautifully made, are as straight limbed, and have nearly the same shape as the horse, only not so good. They walk, trot and gallop in the same manner, and no old hunter will take either a flying or standing leap with more grace or judgment than my young deer will now. They have great strength, and are remarkably active, which renders them very useful in a sledge. They go very wide behind, are fearless of their road, and will swim with most extraordinary swiftness, and to a prodigious distance: I am certain they will swim more than five miles in an hour, and I verily believe six. The stags have a deal more courage than the hinds. When they hear a noise, or if they see a man standing perfectly still, their curiosity will often tempt them to make out the object; a curiosity which I have often known prove fatal to them; for they will frequently gallop or trot down within sixty or a hundred yards, and there stand and gaze for the space of a minute or two. When pursued in the summer time, they always make for the nearest water, in which no land animal has the least chance with them. If their enemy comes up with them, they defend themselves with their horns and hind feet, and are so strong and active, that a fair stroke with either, generally proves fatal to wolf or dog, if the deer be an old one. I have often eaten of venison, and in various countries, but I think none equal to that of the rein-deer, when in proper season. — CARTWRIGHT'S JOURNAL IN LABRADOR.

killed, and the flesh dried in the air. It is also sometimes hardened with smoke, and laid up for travelling provision, when the natives migrate from one part of the country to another. During the winter, the rein-deer are slaughtered as sheep with us; and every four persons in the family are allowed one rein-deer for their week's subsistence. In spring, they spare the herd as much as they can, and live upon fresh fish. In summer, the milk and curd of the rein-deer makes their chief provision; and, in autumn, they live wholly upon fowls, which they kill with a cross-bow, or catch in springes. Nor is this so scanty an allowance; since, at that time, the sea-fowls come in such abundance, that their ponds and springs are covered over.

The milk, when newly taken, is warmed in a cauldron, and thickened with rennet, and then the curd is pressed into cheeses, which are little and well tasted. These are never found to breed mites as the cheese of other countries, probably because the mite fly is not to be found in Lapland. The whey which remains is warmed up again, and becomes of a consistence as if thickened with the white of eggs. Upon this the Laplanders feed during the summer; it is pleasant and well tasted, but not very nourishing.

The skin[*] is even a more valuable part of this animal than either of the

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[*] Wapeti Deer.—The wapeti are very extraordinary non-descript animals, of the cervus or deer genus, but as large as the horse, and nearly as gentle as the lamb; as they will caress their visiters, and receive food from their hands. Four of these elegant and interesting animals were brought into this country in 1817, and purchased by Lord James Murray at a large price. This nobleman has succeeded in extending the breed, and has now three generations of them at Datchet, near Windsor; nor has he lost a single one in breeding them.

It is remarkable that the wapeti have scarcely been mentioned by any European naturalist, and the history of them is consequently very limited. They were first introduced into the United States at Baltimore, by a German naturalist, who was employed some years in exploring the Upper Missouri, where they are domesticated by the Indians, drawing their sledges at a rapid rate, and supply them with the most delicious venison as food. They are naturally very timid animals, and at the same time of such power and activity when grown, that it is not possible to take them out of the forest alive. The natives, therefore, catch them in nets when young, and rear them in their houses with great care and kindness: they then use them for carrying burdens: or drawing their sledges in winter over the snow and ice.

In their native wilds, each male wapeti has his own peculiar family or fraternity; each family its own peculiar range of pasture; and their attachment to each other is so strong, that the hunters know, if they kill one of a family, they can easily get the remainder, who can scarcely be forced from the body of their slain companion.

Those exhibited in London lost none of their natural attachment by being domesticated; they could not be separated for a moment but by force; and the instant they were parted, they expressed their distress by a shrill, low shriek. The Upper Missouri, whence these wapeti had been brought, is in the same latitude as England, but its winters are a little more rigorous, and its summers somewhat warmer.

These animals, whose aboriginal name is that of wapeti, are known to the settlers in North America by the name of the elk, and are supposed to be of the same species as the great antediluvian elk, whose enormous fossil remains are frequently found in that country; and of which specimens may be found in the British Museum.

The head of the wapeti resembles that of the common American deer and of the horse; but it is pointed, and is in its action like the camel. The legs are admirably formed for strength and activity, resembling those of the race horse, particularly the hinder legs. On the outside of each of these is a protuberance covered with yellow hair. In this a gland is seated that secretes an unctuous substance, which the animal applies to smooth and dress its coat; and when it is thus dressed, it becomes impervious to rain or to water, even in swimming a river.

The wapeti has an oblique slit or opening under each eye, of nearly an inch long, which appears to be an auxiliary nostril. The animal has no voice like the horse or the ox, and his organ seems to be given him as a compensation, for with it he can make a noise or loud whistle.

The wapeti have the cloven foot and chew the cud like an ox; but they have the bridle tusk like the horse. The wapeti are about twelve years old before they come to maturity, and they are then about sixteen hands high. Their horns, which are nearly five feet in length, weigh upwards of fifty pounds. They live to a great age, so that the Indians, when speaking of an old man, say he is as old as a wapeti. The food of the wapeti, in former. From that part of it which covered the head and feet, they make their strong snow-shoes with the hair on the outside. Of the other parts they compose their garments, which are extremely warm, and which cover them all over. The hair of these also is on the outside; and they sometimes line them within with the fur of the glutton, or some other warm furred animal of that climate. These skins also serve them for beds.

In short, no part of this animal is thrown away as useless. The blood is preserved in small casks, to make sauce with the marrow in spring. The horns are sold to be converted into glue. The sinews are dried, and divided so as to make the strongest kind of sowing thread, not unlike catgut. The tongues, which are considered as a great delicacy, are dried, and sold into the more southern provinces. The intestines themselves are washed like our tripe, and in high esteem among the natives. Thus the Laplander finds all his necessities amply supplied from this single animal; and he who has a large herd of these animals has no idea of higher luxury.

But, although the rein-deer be a very hardy and vigorous animal, it is not without its diseases. I have already mentioned the pain it feels from the gnat, and the apprehensions it is under from the gadfly. Its hide is often found pierced in a hundred places, like a sieve, from this insect, and not a few die in their third year, from this very cause. Their teats also are subject to cracking, so that blood comes instead of milk. They sometimes take a loathing for their food; and, instead of eating, stand still, and chew the cud. They are also troubled with a vertigo, like the elk, and turn round often till they die. The Laplander judges of their state by the manner of their turning. If they turn to the right, he judges their disorder but slight; if they turn to the left, he deems it incurable. The rein-deer are also subject to ulcers near the hoof, which unqualifies them for travelling, or keeping with the herd. But the most fatal disorder of all is that which the natives call the suddataka, which attacks this animal at all seasons of the year. The instant it is seized with this disease it begins to breathe with greater difficulty, its eyes begin to stare, and its nostrils to expand. It acquires also an unusual degree of ferocity, and attacks all it meets indiscriminately. Still, however, it continues to feed as if in health, but is not seen to chew the cud, and it lies down more frequently than before. In this manner it continues, every day consuming and growing more lean, till at last it dies from mere inanition: and not one of these that are attacked with this disorder are ever found to recover. Notwithstanding, it is but very lately known in that part of the world; although, during the last ten or fifteen years, it has spoiled whole provinces of this necessary creature. It is contagious; and the moment the Laplander perceives any of his herd infected, he hastens to kill them immediately, before it spreads any farther. When examined internally, there is a frothy substance found in the brain, and round the lungs; the intestines are lax and flabby, and the spleen is diminished almost to nothing. The Laplander's only cure in all these disorders, is to anoint the animal's back with tar; if this does not succeed, he considers the disease as beyond the power of art; and, with his natural phlegm, submits to the severities of fortune.

Besides the internal maladies of this animal, there are some external enemies which it has to fear. The bears now and then make depredations upon the herd; but of all their persecutors, the creature called the glutton is the most dangerous and the most successful. The war between these is carried on not less in Lapland than in North America, where the rein-deer is called the caribou, and the glutton the carcajou. This animal, which is not above the size of a badger, waits whole weeks together for its prey, hid in the branches of some spreading tree; and when the wild rein-deer passes underneath, it

a domestic state, is the same as the horse; and they are, if properly managed, as tractable. Those lately exhibited were tried in harness, in the exhibition room, where they drew a tilbury admirably.

The wapeti is justly esteemed the pride of the American forest, and is the handsomest and most noble quadruped yet discovered in that country.

instantly drops down upon it, fixing its teeth and claws into the neck, just behind the horns. It is in vain that the wounded animal then flies for protection, that it rustles among the branches of the forest, the glutton still holds its former position; and although it often loses a part of its skin and flesh, which are rubbed off against the trees, yet it still keeps fast, until its prey drops with fatigue and loss of blood. The deer has but one only method of escape, which is by jumping into the water: that element its enemy cannot endure; for, as we are told, it quits its hold immediately, and then thinks only of providing for its own proper security.*

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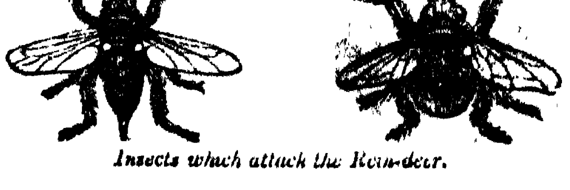
* **The Laplander and his herd.**—The movements of the wandering Laplander are determined by those of his deer. As camels constitute the chief possession of an Arab, so do the rein-deer comprise all the wealth of a Laplander. The number of deer belonging to a herd is from three to five hundred; with these a Laplander can do well, and live in tolerable comfort. He can make in summer a tolerable quantity of cheese, for the year's consumption; and during the winter season, can afford to kill deer enough to supply him and his family pretty constantly with venison. With two hundred deer, a man, if his family be but small, can manage to get on. If he have but one hundred, his subsistence is very precarious. Should he have but fifty, he is no longer independent, or able to keep a separate establishment, but generally joins his small herd with that of some richer Laplander, being then considered more in the light of a menial, undertaking the laborious office of attending the herd. With his stock, the Laplander wanders through the greatest variety of wild and beautiful scenery; but he is little sensible to the impressions which such regions produce upon the mind of an intelligent traveller. The rich summer scenes of Lapland are wonderfully enlivened by the presence of the wanderer and his herds. Von Burk, a celebrated traveller, has well described the evening milking time. "It is a new and pleasing spectacle, to see in the evening the herd assembled round the encampment to be milked. On all the hills around, every thing is in an instant, full of life and motion. The busy dogs are every where barking, and bring the mass nearer and nearer, and the rein-deer bound and run, stand still, and bound again, in an indescribable variety of movements. When the feeding animal, frightened by the dog, raises his head, and displays aloft his lofty and proud antlers, what a beautiful and majestic sight! And when he courses over the ground, how fleet and light are his speed and carriage! We never hear the foot on the earth, and nothing but the incessant crackling of the knee-joints, as if produced by a repetition of electric shocks—a singular noise; and from the number of rein-deer, by whom it is produced, it is heard at a great distance. When all the herd, consisting of three or four hundred, at last reach the encampment, they stand still, or repose themselves, or frisk about in confidence, play with their antlers with each other, or in groups surround a patch of moss browsing. When the maidens run about with their milk vessels from deer to deer, the servant throws a bark halter round the antlers of the animal, and draws it towards them."

Deer-hunting by Lamplight.—It is the habit of deer to frequent the creeks and rivers in the night during the warm months, particularly when the musquitoes are troublesome, and to wade into the water and remain there for some hours. The hunters, in order to pursue them thus, procure a canoe as light as possible, but at the same time sufficiently large to carry two men: a thin plank of wood, about a foot wide, and three feet and a half long. This is fixed in the prow of the canoe, like a mast, and in its front is a little shelf, upon which a common lantern, deprived of its door, with a lighted candle, is placed.

Having thus arranged matters, the hunters embark, and paddle as noiselessly and cautiously as possible along shore. As soon as the canoe is within sight of the deer, they commence gazing at the light; and it seems to fascinate them so completely, that they pay no attention to any other object. But this fascination regards only their sense of sight; their hearing remains as acute as ever, and the most trivial noise will suffice to scare them. In cocking their pieces, therefore, the hunters are very cautious, avoiding all noise, and keeping the canoe so steered as to have the light shining straight to the eyes of the deer. It is not uncommon to be able to approach within twenty, or even ten paces.

So easy is this kind of shooting, that an old Frenchman of the *Prairie des Chiens* is said to have killed as many as seven deer in one night.—American Sporting Mag.



Insects which attack the Rein-deer.

CHAP. X.

QUADRUPEDS OF THE HOG KIND.*

(Sow.)

Animals of the hog kind seem to unite in themselves all those distinctions by which others are separated.† They resemble those of the horse kind in the number of their teeth, which in all amount to forty-four, in the length of their head, and in having but a single stomach. They resemble the cow kind in their cloven hoofs and the position of their intestines; and they resemble those of the claw-footed kind in their appetite for flesh, in their not chewing the cud, and in their numerous progeny. Thus this species serves to fill up that chasm which is found between the carnivorous kinds and those that live upon grass; being possessed of the ravenous appetite of the one, and the inoffensive nature of the other. We may consider them, therefore, as of a middle nature, which we can refer neither to the rapacious nor the peaceful kinds, and yet partaking somewhat of the nature of both. Like the rapacious kinds, they are found to have short intestines; their hoofs also, though cloven to the sight, will, upon anatomical inspection, appear to be supplied with bones like beasts of prey; and the number of their teats also increase the similitude: on the other hand, in a natural state they live upon vegetables, and seldom seek after animal food, except when urged by necessity. They offend no other animal of the forest, at the same time that they are furnished with arms to terrify the bravest.

THE WILD BOAR,‡ which is the original of all the varieties we find in this creature, is by no means so stupid nor so filthy an animal as that we have reduced to tameness; he is much smaller than the tame hog, and does not vary in his colour as those of the domestic kind do, but is always found of an iron grey, inclining to black; his snout is much longer than that of the tame hog, and the ears are shorter, rounder and black; of which colour are also the feet and the tail. He roots the ground in a different manner from the common hog: for as this turns up the earth in little spots here and there, so the wild boar ploughs it up like a furrow, and does irreparable damage in the cultivated lands of the farmer. The tusks also of this animal are larger than in the tame breed, some of them being seen almost a foot long.(*g*) These, as is well known, grow from both the under and upper jaw, bend upwards circularly, and are exceedingly sharp at the points. They differ from the tusks of the elephant in this, that they never fall; and it is remarkable of all the hog kind, that they never shed their teeth as other animals are seen to do. The tusks of the lower jaw are always the most to be dreaded, and are found to give very terrible wounds.

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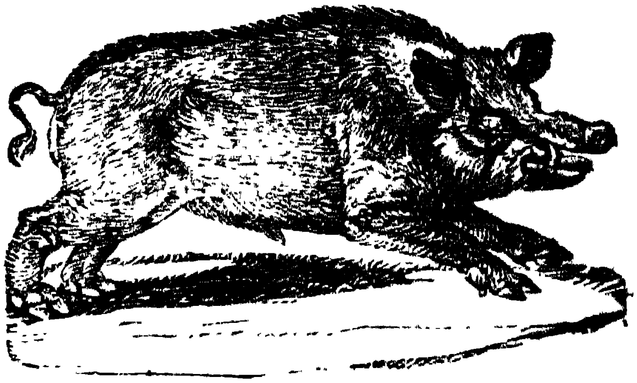
* The quadrupeds of this kind have four front teeth in the upper jaw, which converge at their points; and generally six in the lower jaw, which project. The canine teeth, or tusks, are two in each jaw; those in the upper jaw short, those in the lower extending beyond the mouth. The snout is prominent, movable, and has the appearance of having been abruptly cut off; the hoofs are cloven.

† Sus, or Swine.—This name has been extended by naturalists from the animal commonly so called, to all those which have general relation with it. Still these relations are not so close as to prevent the different species from forming very distinct and characteristic groups whose organic modifications are sufficiently important.

The domestic hog may serve to give a pretty exact idea of the other species of the genus. Their proportions and gait are equally clumsy. Heaviness and length of head, short neck, limbs short and thin in proportion to the body, are their principal external traits. Their usual pace is a trot, they go with the head downwards and the eyes directed forwards. They delight in humid, marshy and muddy places, where they dig for roots and worms. They feed almost indiscriminately on animal or vegetable substances; but it may be considered that roots and grains form their principal nutriment. They are found in very large herds, and usually in unfrequented places. The voice of all the species resembles more or less that of our domestic hog. They are found in all parts of the globe, with the exception of New Holland.—Griffith in Cuvier.

‡ The Wild Boar.—Man, in a social state, was not satisfied with having reduced to subjection animals which appeared untameable—the massy and powerful ox, his drudge in agriculture,—searching through rocks and precipices for the ram and the goat, to form colonies around him for an abundant supply of nutriment and clothing; with having subdued, and softened the carniverous nature of the dog, and transformed him into a guardian, a guide, a companion, and a friend; having subjugated the most useful species, and satisfied his most pressing wants, still desirous of beholding the most perfect abundance around him, he proceeded



(Wild Boar.)

The wild boar can properly be called neither a solitary nor a gregarious animal. The three first years the whole litter follows the sow, and the family lives in a herd together. They are then called beasts of company, and unite their common forces against the invasions of the wolf, or the more formidable beasts of prey. Upon this their principal safety while young depends, for when attacked they give each other mutual assistance, calling to each other with a very loud and fierce note; the strongest face the danger; they form a ring, and the weakest fall into the centre. In this position few ravenous beasts dare venture to attack them, but pursue the chase where there is less resistance and danger. However, when the wild boar is come to a state of maturity, and when conscious of his own superior strength, he then walks the forest alone, and fearless. At that time he dreads no single creature, nor does he turn out of his way even for man himself. He does not seek danger, and he does not much seem to avoid it.*

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to lay other tribes of the animal kingdom under contribution. He drew the formidable boar from his native forests, and by care and by attention to the quantity and quality of his nutriment, has rendered its flesh one of the most common and most savoury articles of diet.—Griffith.

* Courage of Hogs.—The following facts in the natural history of the hog are, we presume, new to most of our readers, and are extracted from some observations on the clime and productions of Washington county, Ohio, inserted in Professor Silliman's Journal. "In the early settlement of the county, when the woods were full of wild plants, neat cattle could live very comfortably the whole winter without any assistance from man, and, at this time large numbers of hogs pass the winter as independently as the deer and the bears, subsisting on nuts and acorns. Single individuals are sometimes destroyed by the bears and wolves, but a gang of 10 or 20 hogs are more than a match for a wolf or a panther. An old hunter informed me that he once saw a large panther spring from a tree into a drove of wood hogs who were aware of his approach, and prepared for defence; the moment he touched the ground the large hogs fell upon him with their tusks, and the weight of their bodies, and killed him and tore him in pieces in a few minutes."—Arcana of Science, 1828—p. 112.

Anecdote.—M. de Dieskau tells us, that he made a wild boar so tame, that the animal though nearly three years old, would go up stairs into his apartment, fawn upon him like a dog, and eat from his hand. He also endeavoured to bring up one which he

(*g*) Buffon, vol ix. p. 147.

This animal is, therefore, seldom attacked, but at a disadvantage, either by numbers, or when found sleeping by moon-light. The hunting the wild boar is one of the principal amusements of the nobility in those countries where it is to be found. The dogs provided for this sport are of a slow, heavy kind. Those used for hunting the stag, or the roe-buck, would be very improper, as they would too soon come up with their prey; and, instead of a chase, would only furnish out an engagement. A small mastiff is, therefore, chosen; nor are the hunters much mindful of the goodness of their nose, as the wild boar leaves so strong a scent, that it is impossible for them to mistake its course. They never hunt any but the largest and the oldest, which are known by their tracks. When the boar is *reared*, as is the expression for driving him from his covert, he goes slowly and uniformly forward, not much afraid, nor very far before his pursuers. At the end of every half mile, or thereabouts, he turns round, stops till the hounds come up, and offers to attack them. These, on the other hand, knowing their danger, keep off, and bay him at a distance. After they have for awhile gazed upon each other, with mutual animosity, the boar again slowly goes on his course, and the dogs renew their pursuit. In this manner the charge is sustained, and the chase continues till the boar is quite tired, and refuses to go any farther. The dogs then attempt to close in upon him from behind; those which are young, fierce, and unaccustomed to the chase, are generally the foremost, and often lose their lives by their ardour. Those which are older and better trained, are content to wait until the hunters come up, who strike at him with their spears, and, after several blows, dispatch or disable him. The instant the animal is killed, they cut off the testicles, which would otherwise give a taint to the flesh; and the huntsmen celebrate the victory with their horns.

THE HOG* in a natural state, is found to feed chiefly upon roots and

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had caught very young, and which formed such an attachment to a young lady in the house, that he accompanied her wherever she went, and slept under her bed. Once he attacked her maid as she was undressing her mistress, and, if he had been strong enough, would have done her some material injury. This lady was the only person for whom the pig showed any affection, although he was not fed by her. At last he fretted himself to death, on account of a fox which had been taken into the house to be tamed.

* Hogs in ancient times.—Among the ancients, the hog was in very high esteem. It was the peculiar sacrifice to Ceres, the goddess of harvest. In the island of Crete, hogs were regarded as sacred. In ancient Rome, very particular attention was bestowed upon them, and the art of rearing and fattening them was much studied, an art which the Latin writers on rural economy, have termed Porculatio. Under the emperors, gluttony and epicurism were carried to an excess equally cruel and disgusting. Among the rich there were two very famous manners of dressing this animal. The one consisted in serving a hog up entire, with one side roasted and the other boiled. The other was called the *Trojan*, in allusion to the Trojan horse, whose interior was filled with combatants. The inside of the hog, from which the viscera had been taken, was stuffed with victims of all kinds, such as thrushes, larks, beccaficoes, oysters, &c the whole being bathed in the best wine and the most exquisite gravy. So great was the expense of this dish, that it became the subject of a sumptuary law, while the barbarous modes of torturing the poor animal to death, for the purpose of imparting a higher flavour to the flesh, passed unpunished and unregarded. It is not possible to read the anecdotes found in history, of such infernal gluttony, without horror; but we shall forbear any mention of atrocities which make us blush at belonging to the species capable of committing them.

In hot climates the flesh of swine is not good. Sonnini remarks, that in Egypt, Syria and even the southern parts of Greece, the meat, though very white and delicate, is so far from firm, and so surcharged with fat, that it disagrees with the strongest stomach. It is, therefore, considered unwholesome, and this will account for its proscription, by divine authority, and by the legislators of the east. Such an abstinence was doubtless indispensable to health, under the burning suns of Egypt and Arabia. The Egyptians were permitted to eat pork only once a year, on the feast day of the moon, and then they sacrificed a number of these animals to that planet. At other times, if any one even touched a hog, he was obliged immediately to plunge into the Nile, with his clothes on, by way of purification. The swine-herds formed an isolated class, the outcasts of society. They were interdicted from entering the temples, or intermarrying with any other families.

vegetables; it seldom attacks any other animal, being content with such provisions as it procures without danger. Whatever animal happens to die in the forest, or is so wounded that it can make no resistance, becomes a prey to the hog, who seldom refuses animal food, how putrid soever, although it is never at the pains of taking or procuring it alive. For this reason, it seems a glutton rather by accident than choice, content with vegetable food, and only devouring flesh when pressed by necessity, and when it happens to offer. Indeed, if we behold the hog in its domestic state, it is the most sordid and brutal animal in nature. (*g*) The awkwardness of its form seems to influence its appetites; and all its sensations are as gross as its shapes are unsightly. It seems possessed only of an insatiable desire of eating, and seems to make choice only of what other animals find the most offensive. But we ought to consider that the hog with us is in an unnatural state, and that it is in a manner compelled to feed in this filthy manner, from want of that proper nourishment which it finds in the forest. When in a state of wildness,* it is of all other quadrupeds the most delicate in the choice of what vegetables it shall feed on, and rejects a greater number than any of the rest. The cow, for instance, as we are assured by Linnæus, eats two hundred and seventy-six plants, and rejects two hundred and eighteen; the goat eats four hundred and forty-nine, and rejects a hundred and twenty-six; the sheep eats three hundred and eighty-seven, and rejects a hundred and forty-one; the horse eats two hundred and sixty-two, and rejects two hundred and twelve; but the hog, more nice in its provision than any of the former, eats but seventy-two plants, and rejects a hundred and seventy-one.

The hog is, by nature, stupid, inactive, and drowsy; if undisturbed, it would sleep half its time; but it is frequently awaked by the calls of appetite, which when it has satisfied, it goes to rest again.† Its whole life is thus a round of sleep and gluttony; and, if supplied with sufficient food, it soon grows unfit even for its own existence; its flesh becomes a greater load than its legs are able to support, and it continues to feed lying down, or kneeling, an helpless

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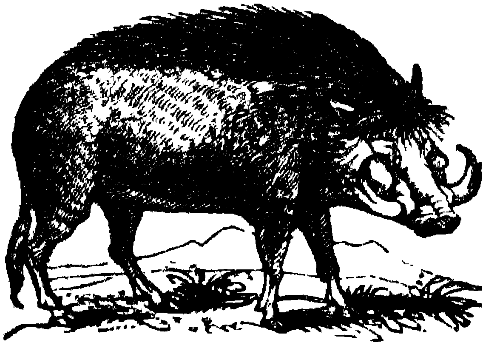

(The Masked Boar.)

* THE MASKED BOAR (*Sus Larvatus.*) — This species is distinguished by a fleshy protuberance on the fore part of the head, enveloping the upper part of it like a mask. It is a native of the Cape, nearly the size of the European boar, and has all its proportions. The only distinction is the fleshy prominences. The head of this species is morever, distinguished by a large arch formed by the cheek-bones, and by the long surface to which the muscles of the trunk are attached. The habits of this animal are little known; but it appears to be very wild, dangerous, and untractable. There is a specimen in the British Museum, under the name of *Sus Larvatus*, to which Cuvier refers for the type of Sus Larvatus. It has not the fleshy prominences, but the specimen being dry, may account for the difference.—ED.

† INTELLIGENCE OF THIS GENUS. — The intelligence of these animals is limited, and they are not in general very susceptible of education. The learned pigs which are exhibited about prove, however, what may be done by the persevering industry of man. "A gamekeeper of Sir H. Mildmay," says the Rev. Mr. Daniel, "actually broke a black sow to find game, and to back and stand. Slut, which was the name he gave her, was rendered as staunch as any pointer. After Sir Henry's death, the pig-pointer was sold for a very considerable sum of money.

THEIR UTILITY. — In the island of Minorca, hogs are converted into beasts of draught: a cow, a sow, and two young horses have been there seen yoked together; and of the four, the cow drew the least. The ass and the hog are here also common helpmates, and are frequently yoked together to plough the land. In some parts of Italy, hogs are used in hunting for truffles, which grow some inches deep in the ground. A cord being tied round the hind leg of one of the animals, the beast is driven into the pastures, and wherever it stops and begins to root with its nose, truffles are always to be found.

(*g*) Buffon, vol. ix. p. 14.

instance of indulged sensuality. The only time it seems to have passions of a more active nature, is, when it is incited by venery, or when the wind blows with any vehemence. Upon this occasion, it is so agitated as to run violently towards its sty, screaming horribly at the same time, which seems to argue that it is naturally fond of a warm climate. It appears also to foresee the approach of bad weather, bringing straw to its sty in its mouth, preparing a bed, and hiding itself from the impending storm. Nor is it less agitated when it hears any of its kind in distress: when a hog is caught in a gate, as is often the case, or when it suffers any of the usual domestic operations of ringing or spaying, all the rest are then seen to gather round it, to lend their fruitless assistance, and to sympathize with its sufferings. They have often also been known to gather round a dog that had teased them, and kill him upon the spot.

Most of the diseases of this animal arise from intemperance; measles, imposthumes, and scrophulous swellings are reckoned among the number. It is thought by some that they wallow in the mire to destroy a sort of louse or insect that is often found to infest them; however, they are generally known to live, when so permitted, to eighteen or twenty years; and the females produce till the age of fifteen. As they produce from ten to twenty young at a litter, and that twice a year, we may easily compute how numerous they would shortly become, if not diminished by human industry. In the wild state they are less prolific; and the sow of the woods brings forth but once a year—probably, because exhausted by rearing up her former numerous progeny.*

It would be superfluous to dwell longer upon the nature and qualities of an animal too well known to need a description: there are few, even in cities, who are unacquainted with its uses, its appetites, and way of living. It will be sufficient, therefore, to observe that the wild boar was formerly a native of our country, as appears from the laws of Hoel Dda, (g) the famous Welsh legislator, who permitted his grand huntsman to chase that animal from the middle of November to the beginning of December. William the Conqueror also punished such as were convicted of killing the wild boar in his forests, with the loss of their eyes. At present, the whole wild breed is extinct; but no country makes greater use of the tame kinds, as their flesh, which bears salt better than that of any other animal, makes a principal part of the provisions of the British navy.

As this animal is a native of almost every country, there are some varieties found in the species. There is a remarkable variety of this animal about Upsal, (g) which is single-hoofed like the horse; but in no other respect differing from the common kinds. The hog common in Guinea differs also in somethings from our own: though shaped exactly as ours, it is of a reddish colour, with long ears, which end in a sharp point, and a tail which hangs down to the pastern; the whole body is covered with short, red, shining hair, without any bristles, but pretty long near the tail. Their flesh is said to be excellent, and they are very tame.

All these, from their near resemblance to the hog, may be considered as of the same species. The East Indian hog, we well know, breeds with the common kind; whether the same obtains between it, and those of Upsal and Guinea, we cannot directly affirm; but where the external similitude is so strong, we may be induced to believe, that the appetites and habits are the same.[*]

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* Prolific Swine.—The most prolific kind of swine is the improved breed, which is a mixture of the Chinese black swine, with others of the larger British breed: they possess qualities superior to either of the original stocks. They are very prolific; are sooner made fat than the larger kind, upon less provisions, and they cut up when killed into more useful and convenient portions. Another breed of swine has been introduced into this kingdom, which is expected to rival, or excel, all the others. The original stock was produced from a wild boar brought from America, and a sow of the improved Chinese breed. The sows are extremely prolific; and the colour of the pigs in general is most fancifully diversified: some are striped longitudinally, with brown and black; others brown and bluish grey; and others with black and white. The colour of the boar was a rusty brown.

(g) British Zoology, vol. i. p. 44.

(g) Amœnit Acad. vol. v. p. 465.

THE PECCARY, OR TAJACU.—That animal which of all others most resembles a hog, and yet is of a formation very distinct from it, is called the Peccary, or Tajacu. It is a native of America, and found there, in such numbers, that they are seen in herds of several hundreds together, grazing among the woods, and inoffensive, except when offended.

The peccary, at first view, resembles a small hog: the form of its body, the shape of its head, the length of its snout, and the form of its legs, are entirely alike: however, when we come to examine it nearer, the differences begin to appear.[†]

The colour of the body is grizzly, and beset with bristles, thicker and stronger than those of a common hog; though not near so thick as those of a porcupine, they resemble them in this respect, that they are variegated with black and white rings. The belly is almost bare; and the short bristles on the sides gradually increase in length as they approach the ridge of the back, where some are five inches long. On the head also, between the ears, there is a large tuft of bristles, that are chiefly black. The ears are about two inches and a half long, and stand upright; and the eyes resemble those of a common hog, only they are smaller. From the lower corner of the eye to the snout, is usually six inches; and the snout itself is like that of a hog's, though it is but small. One side of the lower lip is generally smooth, by the rubbing of the tusk of the upper jaw. The feet and hoofs are perfectly like those of the common hog; but, as was already observed, it has no tail. There are some anatomical differences in its internal structure from that of the common hog.

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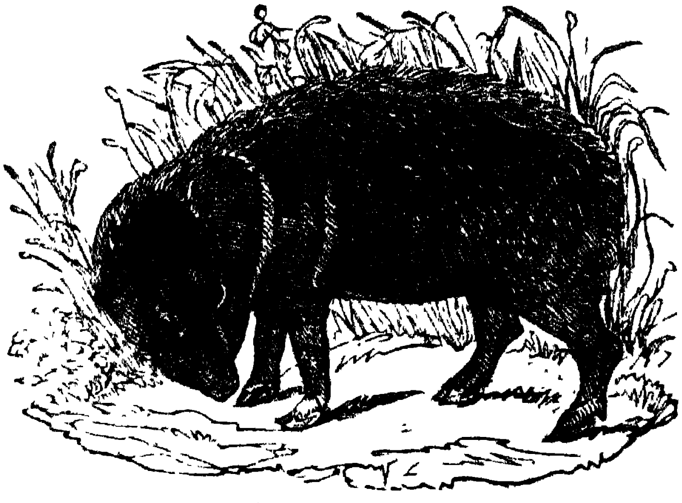
[*] Fecundity of Swine.—The astonishing fecundity of the animals now under consideration is one of their most obvious and remarkable characters. They live and multiply in every climate of the world, with the exception of the Polar regions; accordingly, we find that though their natural life would, if permitted, extend to fifteen or twenty years, yet they are capable of reproduction from nine months or a year old. Their lubricity is extreme, and even furious. The rut is almost perpetual, and the female, even in a state of pregnancy, will seek the male. It is even said, she will occasionally admit the advances of a male of a different species. The production of fifteen, or even twenty, in a litter, is not unfrequent, and instances have been known even of thirty-seven.

The celebrated Vauban has made a calculation of the probable production of an ordinary sow, during the space of ten years. He has not comprehended the male pigs in his estimate, though they may reasonably be supposed as numerous as the females in each litter. Moreover, six young ones only, male and female, have been allowed to each, though generally they are more numerous. The result is, that the product of a single sow in eleven years, which are equivalent to ten generations, will be six million, four hundred and thirty-four thousand, eight hundred and thirty-eight pigs! Taking it, however, in round numbers, and allowing for accident, disease, and the ravages of wolves, there will remain 6,000,000 of pigs, which is about the number existing in France. "Were we to extend our calculations," says Vauban, "to the twelfth generation, we should find as great a number to result as all Europe would be capable of supporting; and were they to be continued to the sixteenth, as great a number would result as would be adequate to the abundant peopling of the globe.

Instances of Fecundity.—A remarkable instance occurred in this country about thirty years ago, of the prolific nature of this animal. A sow belonging to Mr. Thomas Richdale, Keyworth, Leicestershire, had produced, in the year 1797, three hundred and fifty-five young ones in twenty litters; four years before, it brought forth two hundred and five in twelve litters; and afterwards it had eight litters more. The number produced in these last added to the first, made three hundred and fifty-five.

Remarks.—This remarkable fecundity, united with the deficiency of all other useful qualities in this animal, and the excellency of its flesh, points it out as a most obvious source of nutriment. Let the consumption be ever so great, there will always be an ample supply for the demand. The care, too, with which these animals are brought up and fed renders them a most advantageous property to the poorer classes of society. In the country, there are few families that cannot rear a single pig every year, and thus procure a cheap and nutritious diet, not to mention the profit arising from the lard, fat, &c. of the animal. In some countries the principal source of existence to the poor peasant is his pig. In Ireland, these animals are brought up and fattened to a large size, and then brought to market by the owner and sold at a tolerable price; with part of this, a younger, leaner, and worse-conditioned pig is purchased, fattened in the same way, and sold at a profit. Happy for the poor peasant, if this only property be not seized by some inexorable landlord, which is too frequently the case in that unhappy country.—Griffith. *Animal Kingdom, by Cuvier.*

[†] Distinction of the Peccary from the Hog.—The peccaries differ from the wild boar and domestic hog, in having the head shorter and thicker, the angle at the buttock closer, and the body, neck, ears, and legs shorter. They have no visible tail; but D'Azara states that a very short one may be found on close inspection, which is flat; their bristles are nearly stiff enough to penetrate a considerable resistance.



(The Peccary.)

The peccary may be tamed like the hog, and has pretty nearly the same habits and natural inclinations.* It feeds upon the same aliments; its flesh, though drier and leaner than that of the hog, is pretty good eating; it is improved by castration; and, when killed, not only the parts of generation must be taken instantly away, but also the navel on the back, with all the glands that contribute to its supply. If this operation be defered for only half an hour, the flesh becomes utterly unfit to be eaten.

The peccary is extremely numerous in all the parts of Southern America. They go in herds of two or three hundred together, and unite, like hogs, in each other's defence. They are particularly fierce when their young are attempted to be taken from them: they surround the plunderer, attack him without fear, and frequently make his life pay the forfeit of his rashness. When any of the natives are pursued by a herd in this manner, they frequently climb a tree to avoid them; while the peccaries gather round the root, threaten with their tusks, and their rough bristles standing erect, as in the hog kind, they assume a very terrible appearance. In this manner they remain at the foot of the tree for hours together; while the hunter is obliged to wait patiently, and not without apprehensions, until they think fit to retire.†

The peccary is rather fond of the mountainous parts of the country, than the lowlands; it seems to delight neither in the marshes nor the mud, like our hogs; it keeps among the woods, where it subsists upon wild fruits, roots, and vegetables; it is also an unceasing enemy to the lizard, the toad, and all the serpent kinds, with which these uncultivated forests abound. As soon as it perceives a serpent, or a viper, it at once seizes it with its fore hoofs and teeth, skins it in an instant, and devours the flesh. This is often seen, and may, therefore, be readily credited; but as to its applying to a proper vegetable immediately after, as an antidote to the poison of the animal it had devoured, this part of the relation we may very well suspect.

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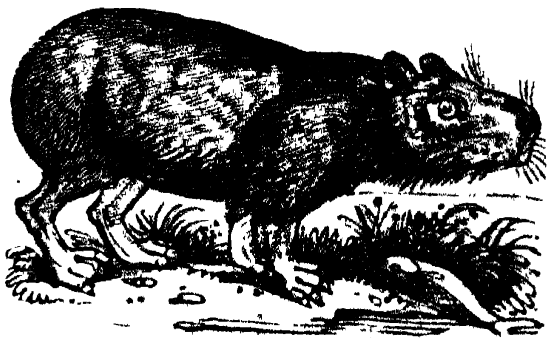
* **Tame Peccaries.**—Two of these animals in the French menagerie lived on the best possible terms with the dogs and other animals in the yard; they returned of themselves to their stall, came when called, and appeared fond of being caressed. But they loved liberty, always endeavouring to escape when forced to return, and sometimes attempting to bite; they wounded a young boar which had been placed along with them; they delighted in heat, and suffered much, and grew very thin, from the effects of cold. Bread and fruits constituted their principal nutriment; but, like the domestic hog, they would eat almost anything. They were habitually silent; but, when frightened, would utter a sharp cry, while they expressed their satisfaction by a slight grunting.—Cuvier.

† **The Jagaur and the Peccary.**—It is said that the Jagaur, the great predatory of the American forest, will follow these herds in silence, and seize the opportunity of an individual being in the rear to seize and kill it in an instant, when it immediately takes refuge in a tree, till the herd have passed, and left their dead companions behind. If this trait of character were sufficiently established, it would give rise to many curious reflections. Ed.

The peccary, like the hog, is very prolific; the young ones follow the dam, and do not separate till they have come to perfection. If taken at first, they are very easily tamed, and soon loose all their natural ferocity; however, they never show any remarkable signs of docility, but continue stupid and rude, without attachment, or even seeming to know the hand that feeds them.

The peccary, though like the hog in so many various respects, is, nevertheless, a very distinct race, and will not mix, nor produce an intermediate breed. The European hog has been transplanted into America, and suffered to run wild among the woods: it is often seen to herd among a drove of peccaries, but never to breed from them. They may, therefore, be considered as two distinct creatures: the hog is the larger and the most useful animal; the peccary more feeble and local; the hog subsists in most parts of the world, and in almost every climate; the peccary is a native of the warmer regions, and cannot subsist in ours, without shelter and assistance. It is more than probable, however, that we could readily propagate the breed of this quadruped; and that, in two or three generations, it might be familiarized to our climate; but as it is inferior to the hog in every respect, so it would be needless to admit a new domestic, whose services are better supplied in the old.*

THE CAPIBARA, OR CABIAI.†—There are some quadrupeds so entirely different from any that we are acquainted with, that it is hard to find a well-known animal to which to resemble them. In this case, we must be content to place them near such as they most approach in form and habits, so that the reader may at once have some idea of the creature's shape or disposition, although perhaps an inadequate, and a very confused one.



(Capibara, or Cabiai.)

Upon that confused idea, however, it will be our business to work—to bring it, by degrees, to greater precision—to mark out the differences of form—and thus give the clearest notions that words can easily convey. The known animal is a kind of rude sketch of the figure we want to exhibit; from which, by degrees, we fashion out the shape of the creature we desire should be known; as a statuary seldom begins his work till the rude outline of the figure is given by some other hand. In this manner I have placed the capibara

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[*] **Trade in Bristles.**—In the year 1828, 1,748,921 lbs. of bristles were imported into England from Russia and Prussia, each of which cannot have weighed less than two grains. From this we may fairly conjecture, that 13,431,713,280 bristles were imported in that year. As these are only taken from the top of the hog's back, each hog cannot be supposed to have supplied more than 7,680 bristles, which reckoning each bristle to weigh two grains, will be one pound. Thus, in Russia and Prussia, in 1828, 1,748,921 hogs and boars were killed, to furnish the supply of England with bristles.

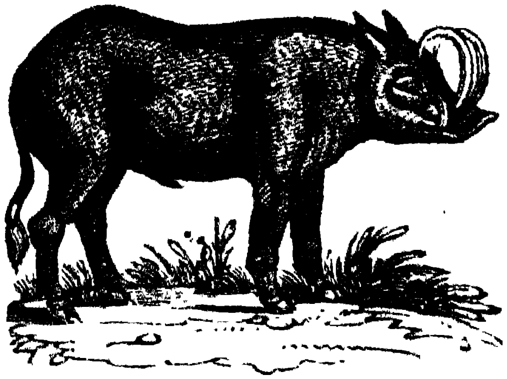
[†] **The Capibara.**—This animal is, by modern zoologists enumerated among the Cavies. It is extremely shy and timid, always going in pairs, and escaping but indifferently, on account of the length of its feet. It will sometimes sit up while feeding, like a squirrel, holding its food between its paws. The fore feet are divided into four toes, connected to each other by a small web at the base, and tipped with thick claws, or rather small hoofs, at the extremities; the hind feet are formed in the same manner, but are divided into three toes only.

Turton.

among the hog kind, merely because it is more like a hog than any other animal commonly known; and yet, more closely examined, it will be found to differ in some of the most obvious particulars.

The Capibara resembles a hog of about two years old, in the shape of its body, and the coarseness and colour of its hair. Like the hog, it has a thick, short neck, and a rounded, bristly back; like the hog, it is fond of the water and marshy places, brings forth many at a time, and, like it, feeds upon animal and vegetable food. But, when examined more nearly, the differences are many and obvious. The head is longer, the eyes are larger, and the snout, instead of being rounded, as in the hog, is split, like that of a rabbit or hare, and furnished with thick, strong whiskers; the mouth is not so wide, the number and the form of the teeth are different, for it is without tusks: like the peccary, it wants a tail; and, unlike to all others of this kind, instead of a cloven hoof, it is in a manner web footed, and thus entirely fitted for swimming and living in the water. The hoofs before are divided into four parts, and those behind into three; between the divisions, there is a prolongation of the skin, so that the foot, when spread in swimming, can beat a greater surface of water. As its feet are thus made for the water, so it is seen to delight entirely in that element; and some naturalists have called it the water-hog for that reason. It is a native of South America, and is chiefly seen frequenting the borders of lakes and rivers, like the otter. It seizes the fish upon which it preys, with its hoofs and teeth, and carries them to the edge of the lake, to devour them at its ease. It lives also upon fruits, corn, and sugar canes. As its legs are long and broad, it is often seen sitting up, like a dog that is taught to beg. Its cry more nearly resembles the braying of an ass, than the grunting of a hog. It seldom goes out, except at night, and that always in company. It never ventures far from the sides of the river or the lake in which it preys; for as it runs ill, because of the length of its feet, and the shortness of its legs, so its only place of safety is the water, into which it immediately plunges when pursued, and keeps so long at the bottom, that the hunter can have no hopes of taking it there. The capibara, even in a state of wildness, is of a gentle nature, and when taken young, is easily tamed. It comes and goes at command, and even shows an attachment to its keeper. Its flesh is said to be fat and tender, but, from the nature of its food, it has a fishy taste, like that of all those which are bred in the water. Its head, however, is said to be excellent, and in this it resembles the beaver, whose fore parts taste like flesh, and the hinder like the fish it feeds on.

THE BABYROUESSA, or INDIAN HOG.—The Babyrouessa is still more remote from the hog kind than the capibara; and yet most travellers who have described this animal, do not scruple to call it the hog of Borneo, which is an island in the East Indies, where it is principally to be found. Probably the animal's figure upon the whole most resembles that of the hog kind, and may have induced them to rank it among the number: however, when they come to this description, they represent it as having neither the hair, the bristles, the head, the stature, nor the tail of a hog. Its legs, we are told, are longer, its snout shorter, its body more slender, and somewhat resembling that of a stag; its hair is finer, of a grey colour, rather resembling wool than bristles, and its tail also tufted with the same. From these varieties, therefore, it can scarcely be called a hog; and yet, in this class we must be content to rank it until its form and nature come to be better known. What we at present principally distinguish it by, are four enormous tusks, that grow out of each jaw; the two largest from the upper, and the two smallest



(Babyrouessa, or Indian Hog.)

from the under. The jaw bones of this extraordinary animal are found to be very thick and strong; from whence these monstrous tusks are seen to proceed, that distinguish it from all other quadrupeds whatsoever. The two that go from the lower jaw are not above a foot long, but those of the upper are above half a yard: as in the boar, they bend circularly, and the two lower stand in the jaw as they are seen to do in that animal; but the two upper rise from the upper jaw, rather like horns than teeth; and, bending upwards and backwards, sometimes have their points directed to the animal's eyes, and are often fatal by growing into them. Were it not that the babyrouessa has two such large teeth underneath, we might easily suppose the two upper to be horns; and, in fact, their sockets are directed upwards; for which reason Dr. Grew was of that opinion. But, as the teeth of both jaws are of the same consistence, and as they both grow out of sockets in the same manner, the analogy between both is too strong not to suppose them of the same nature. The upper teeth, when they leave the socket, immediately pierce the upper lips of the animal, and grow as if they immediately went from its cheek. The tusks in both jaws are of a very fine ivory, smoother and whiter than that of the elephant, but not so hard or serviceable.

These enormous tusks give this animal a very formidable appearance; and yet it is thought to be much less dangerous than the wild boar.(g) Like animals of the hog kind, they go together in a body, and are often seen in company with the wild boar, with which, however, they are never known to engender They have a very strong scent, which discovers them to the hounds; and, when pursued, they growl dreadfully, often turning back upon the dogs, and wounding them with the tusks of the lower jaw, for those of the upper are rather an obstruction than a defence. They run much swifter than the boar, and have a more exquisite scent, winding the men and the dogs at a great distance. When hunted closely, they generally plunge themselves into the sea, where they swim with great swiftness and facility, diving, and rising again at pleasure; and in this manner they most frequently escape their pursuers.* Although fierce and terrible when offended, yet they are peaceable and harmless when unmolested. They are easily tamed, and their flesh is good to be eaten; but it is said to putrefy in a very short time. They have a way of reposing themselves different from most other animals of the larger kind; which is by hitching one of their upper tusks on the branch of a tree, and then suffering their whole body to swing down at ease. Thus suspended from a tooth, they continue the whole night quite secure, and out of the reach of such animals as hunt them for prey.

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* Hog hunting in the East.—Perhaps no diversion requires more coolness and judgment than hog-hunting. Some are habituated to hunt in canes; some in underwoods; others entirely in grass covers; and as the modes of hunting are diversified in proportion, it requires some few days' practice, to chime well together, and to act in concert. In grass jungles the hog is allowed to run himself out of breath, the horsemen following his track; when he begins to slacken, the spear is thrown which pierces him to the heart. In grass covers, a hog is often started, hunted and killed without being seen till he is dead. In searching for a hog, the persons employed extend in a line, and proceed through the grass in silence, mounted on horses, elephants, &c. so that the game may not be roused too early, and steal off unperceived. The *pariahs*, or village dogs, soon discover by their yelping, the game. Hogs generally lurk in sugar canes or *bunds*, (covers of brambles, underwood and grass mixed,) some of which extend to fifty or a hundred acres. Hogs make for this cover when the canes are cut; and it is observed that they fall off in flesh greatly; the pampered boar is no longer seen, but a meagre, tall beast, whose speed is now as much increased, as his bulk is reduced. They fatten again when the sugar canes are grown. When a hog gains a *bund*, he instantly repairs to some stream or pool. He is instantly attacked; for if he be allowed to lie down or lap in the water, he gets recruited in a surprising manner, and gives a deal of trouble.

It frequently happens that, during a chase over a plain, many persons may be seen cutting the grass. The hog, indignant and vindictive, seldom fails to deviate from his course to visit the poor men in their occupations, frequently ripping them very severely. Hogs do sometimes take strange turns, and occasionally vanish, when it is extremely difficult to account for their disappearance. They have a trick of stopping short at speed, when they find a horseman gaining fast upon them in grass cover; and then they either squat perfectly quiet, or steal back into some thick tuft, in which they will lie. If however they should be espied and goaded, the hog darts forth, and upsets all he finds in his way. At the outset, they generally take a direct course, but change it as circumstances occur. A curious incident took place at Monghyr, where two gentlemen were pursuing a large boar, which ran down a water course leading to a *nullah*, or rivulet. One,

(g) Buffon, vol xxv. p. 179.

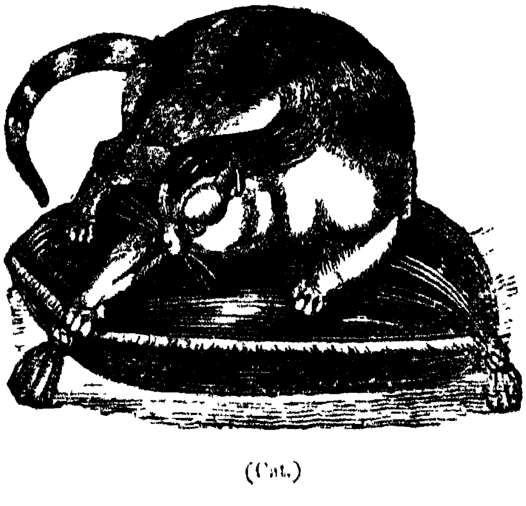
The babyrouessa, though by its teeth and tusks seems fitted for a state of hostility, and probably is carnivorous, yet, nevertheless, seems chiefly to live on vegetables and the leaves of trees. It seldom seeks to break into gardens, like the boar, in order to pillage the more succulent productions of human industry, but lives remote from mankind, content with coarser fare and security.

Such are the animals of the hog kind, which are not distinctly known; and even all these, as we see, have been but imperfectly examined or described. I cannot conclude this account of those animals that are thus furnished with enormous tusks, without observing that there is a strong consent between these and the parts of generation. When castrated, it is well known that the tusks grow much smaller, and are scarce seen to appear without the lips; but what is still more remarkable, is, that in a boar, if the tusks by any accident or design be broken away, the animal abates of its fierceness and venery, and it produces nearly the same effect upon its constitution as if castration had actually taken place.(*g*)

CHAP. XI.

ANIMALS OF THE CAT KIND.*

We have hitherto been describing a class of peaceful and harmless animals, that serve as the instruments of man's happiness, or at least that do not openly oppose him. We come now to a bloody and unrelenting tribe, that disdain to own his power, and carry on unceasing hostilities against him. All the class of the cat kind are chiefly distinguished by their sharp and formidable claws, which they can hide and extend at pleasure. They lead a solitary, ravenous life, neither uniting for their mutual defence, like vegetable feeders, nor for their mutual support, like those of the dog kind. The whole of this cruel and ferocious tribe seek their food alone; and, except at certain seasons, are



(Cat.)

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who was pretty close at his heels, followed; and the hog, disappointed of his drink, reascended the bank to the right of the way by which he had gone down; and then turning again to his right, proceeded through the grass across his former track, and leaped over the ravine he had gone through, as the other gentleman was galloping down it. The hog just passed between the horse's ears and the gentleman's head, and occasioned his hat to fly off him.—ORIENTAL FIELD SPORTS—*abridged.*

* The quadrupeds of this family are distinguished by having six front teeth, the intermediate ones of which are equal: the grinders are three on each side in each jaw; the

(*g*) Lisle's Husbandry, vol ii. p. 329.

even enemies to each other. The dog, the wolf, and the bear, are sometimes known to live upon vegetable or farinaceous food; but all of the cat kind, such as the lion, the tiger, the leopard, and the ounce, devour nothing but flesh, and starve upon any other provision.*

They are, in general, fierce, rapacious, subtle and cruel, unfit for society among each other, and incapable of adding to human happiness. However, it is probable that even the fiercest could be rendered domestic, if man thought the conquest worth the trouble. Lions have been yoked to the chariots of conquerors, and tigers have been taught to tend those herds which they are known at present to destroy; but these services are not sufficient to recompense for the trouble of their keeping; so that ceasing to be useful, they continue to be noxious, and become rebellious subjects because not taken under equal protection with the rest of the brute creation.†

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tongue is furnished with rough prickles pointing backwards; and the claws are sheathed and retractile, except in the lion, which has them retractile, but not sheathed.

* Characteristics of Feline Animals.—Animals of the cat kind are, in a state of nature, almost continually in action both by night and by day. They either walk, creep or advance rapidly by prodigious bounds; but they seldom run, owing, it is believed, to the extreme flexibility of their limbs and vertebral column, which cannot preserve the rigidity necessary to that species of movement. Their sense of sight, especially during twilight, is acute; their hearing very perfect, and their perception of smell less so than in the dog tribe. Their most obtuse sense is that of taste; the lingual nerve in the lion, according to Des Moulins, being no larger than that of a middle-sized dog. In fact, the tongue of these animals is as much an organ of mastication as of taste; its sharp and horny points, inclined backwards, being used for tearing away the softer parts of the animal substances on which they prey. The perception of touch is said to reside very delicately in the small bulbs at the base of the mustachios.—Arcana of Science, 1829.

† Original source of the Domestic Cat.—While speaking of the domestic cat, which is met with in every part of the globe where man, in different states of civilization, has been collected into societies, and has become accustomed to the use of fixed habitations, — we may naturally consider the question of the origin of its domestication and endeavour to ascertain the original or typical species to which the different races of it owe their existence. Many very judicious naturalists have had doubts respecting the source to which our cats have generally been refered. The opinion which has been received and adopted by the greatest number, is, that the wild cat of the forests of Europe and Asia ought to be considered as the original stock of all the races of the domestic cats. But the consideration of this point gives rise to a doubt, which a comparison between our house cat and this, its supposed wild type, tends to strengthen.

When we attempt to trace the domestication of the cat up to its commencement, our thoughts are naturally directed towards those countries in which the earliest marks of civilization appeared. It was from the walls of the temples of Isis, and under the dominion of the Pharoahs, that the first rays of knowledge burst forth, which, after being so successfully cultivated by the Greeks in later times, was gradually transmitted from them to the countries which we now inhabit. Egypt, which beheld the beginning of this civilization, without doubt furnished its inhabitants with this useful animal. The ancient Egyptians would value the good qualities of the cat more than any other agricultural people. If, then, they were acquainted with it, (and everything leads us to believe that they were,) it is evident that a wild species peculiar to those countries has supplied the first domestic race.

In fact, the Egyptian cat, which we have described in this work under the name of *Felis gauté* (*Felis maniculata*), has a much greater resemblance to our house cat than the latter has to the wild cat of the woods; the height and the figures are perfectly similar, the tail is of the same length, and is thinner in both at the extremity than at the root. Our domestic cats of the largest kind are always smaller than the wild species, and there is also a permanent difference in the form of the tail. We know by experience, that a long-continued state of domestication affects the size and the whole physical system of an animal. A superabundance of nourishment and constant attention assist the developement of all their organs, and increase their size. All our animals removed from a wild state, and domesticated, furnish us with proofs of this. The domestic cat, upon the supposition that it is a descendant of the wild cat of the woods, would furnish a proof of the degeneration of its race, a constant forerunner of the entire destruction of it.

When we compare the exterior form of the domestic cat with that of the wild species, we invariably find that the former is smaller; that its tail is longer, and termi-

Other tribes of animals are classed with difficulty, have often but few points of resemblance; and, though alike in form, have different dispositions, and different appetites. But all those of the cat kind, although differing in size, or in colour, are yet nearly allied to each other, being equally fierce, rapacious, and artful; and he that has seen one has seen all. In other creatures there are many changes wrought by human assiduity; the dog, the hog, or the sheep, are altered in their natures and forms, just as the necessities or the caprice of mankind have found fitting; but all of this kind are inflexible in their forms, and wear the print of their natural wildness strong upon them. The dogs or cows vary in different countries, but lions or tigers are still found the same; the very colour is nearly alike in all; and the slightest alterations are sufficient to make a difference in the kinds, and to give the animal a different denomination.

The cat kind are not less remarkable for the sharpness and strength of their claws, which thrust forth from their sheath when they seize their prey, than for the shortness of their snout, the roundness of their head, and the large whiskers which grow on the upper lip. Their teeth also, which amount to the number of thirty, are very formidable; but are rather calculated for tearing their prey than for chewing it; for this reason they feed but slowly; and while they eat, generally continue growling, to deter others from taking a share. In the dog kind, the chief power lies in the under jaw, which is long, and furnished with muscles of amazing strength; but in these the greatest force lies in the claws, which are extended with great ease, and their gripe is so tenacious that nothing can open it. The hinder parts in all these animals are much weaker than those before; and they seem less made for strength than agility. Nor are they endued with the swiftness of most other animals; but generally owe their subsistence rather to catching their prey by surprise than by hunting it fairly down. They all seize it with a bound, at the same time expressing their fierce pleasure with a roar; and their first grasp generally disables the captive from all further resistance. With all these qualifications for slaughter, they nevertheless seem timid and cowardly, and seldom make an attack, like those of the dog kind, at a disadvantage: on the contrary, they fly when the force against them is superior, or even equal to their own; and the lion himself will not venture to make a second attempt, where he has been once repulsed with success. For this reason, in countries, that are tolerably inhabited, the lion is so cowardly, that he is often scared away by the cries of women and children.

The cat, which is the smallest animal of this kind, is the only one that has been taken under human protection, and may be considered as a faithless friend, brought to oppose a still more insidious enemy.(*g*) It is, in fact, the only animal of this kind whose services can more than recompense the trouble of their education, and whose strength is not sufficient to make its anger formidable.* The lion or the tiger may easily be tamed, and rendered subservient to

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nated in a point; while the tail of the wild cat is much shorter in proportion to the size of the animal, and seems as if the end had been cut off, being of the same size at both extremities. The size of the Egyptian cat, our *Felis gaute*, is less than that of the house cat; the tail bears the same proportion to the body, and is of the same shape as that of the common cat. We see, in fact, an agreement in the general appearance of the figures of this Egyptian felis and our cat, and that there is a permanent difference between the latter and the wild species of the forests of Europe and Asia.—ZOOLOGICAL MAGAZINE.

* DOMESTIC EDUCATION OF CATS.—It has not been ascertained at what period cats were first classed among domestic animals; but as this is of little consequence, I will endeavour to give some account of them from the time that their useful and amusing qualities brought them into general notice, as forming a part of our household comforts. The finest species of domestic cats are those called Angora, which are remarkable for size and strength of body, elegance of the head, softness of hair, and docile qualities, which rank them precedent as domestic cats. Every country has its peculiar species: that of Tobolski is red; that of the Cape of Good Hope blue; and those of China and Japan have pendent ears; Pallas informs us, that

(*g*) This description is nearly translated from Mr. Buffon; what is added by me, is marked with inverted commas.

human command; but even in their humblest, and most familiar moments, they are still dangerous; since their strength is such, that the smallest fit of anger or caprice may have dreadful consequences. But the cat, though easily offended, and often capricious in her resentments, is not endowed with powers sufficient to do any great mischief. Of all animals, when young, there is none more pret-

in Russia the muzzle is small and pointed, and the tail six times as long as the body.

At all times cats have acquired some influence, indeed may be considered favourites with women. There were very severe laws enacted in Egypt against those who killed or even ill-treated this animal. They carried their notions so far as to be quite ridiculous; for they actually worshipped them as their gods, made great lamentations at their death, and buried them (according to Herodotus) with much pomp. In China, this animal is indulged with a bed of down and silk, where it remains in a state of indolence, or lies at the feet of its mistress on a sofa, covered over like a child, decorated with a silver collar on its throat, and its ears adorned with ear-rings of jasper or sapphire. The Turks have places made or rented for them, that they may be fed and attended to by servants engaged for the purpose. They enjoy a still happier life in France: as faithful companions to their mistresses, they not only amuse them, but, by their gentleness and playful tricks, dispel *ennui*. They seldom look you in the face, but obliquely.

I have remarked that naturalists have not spoken much in favour of this animal, particularly Buffon, who says, "that the cat may be considered as a faithless friend, brought under human protection to oppose a still more insidious enemy. It is, in fact, the only animal of this tribe whose service can more than recompense the trouble of education, and whose strength is not sufficient to make its anger formidable. Of all animals, when young, there is none more prettily playful than the kitten; but it appears to change this disposition as it grows old, and the innate treachery of its kind begins to show itself. From being naturally ravenous, education teaches it to disguise its appetite, and to seize the favourable moment for plunder. Supple, insinuating, and artful, it has learned the art of concealing its intentions till it can put them in force: whenever the opportunity occurs, it directly seizes upon whatever it finds, flies off with it, and remains at a distance till it thinks its offence is forgotten.

The aversion cats have to anything like slavery or imprisonment is so great, that by means of it they may be forced to prompt obedience; but, under restraint, they are very different; though surrounded by food, when deprived of liberty, they abandon the [illegible] theft or prey, and literally die of [illegible] and hunger. Lemery, after having put a cat into a cage, suffered two or there mice to run through it. Puss, instead of destroying them, only looked at them with apparent indifference. The mice became more bold and even attempted to provoke her; however, it had no effect, as she still remained quiet. Liberty being given her, her strength and voracity returned: so that, had the cage been open, the mice would soon have become her prey. They also fear severe chastisement, and therefore this may be considered the best means of enforcing obedience. It is related that the monks of the Isle of Cyprus instructed cats to drive away serpents which infested the island; and they succeeded so well, that in a short time they were relieved of the venomous reptiles.

The effect that both sound and music have upon this animal is well known. They, like dogs, may be made to answer the call of a whistle. An invalid, who was confined to his room for some time, was much amused by this means, and with other proofs of the docility and sagacity of a favourite cat. Valmont de Bomare saw, at the fair of St. Germain, cats turned musicians, the performance being announced by the title of the "Mewing Concert." In the centre was an ape, beating time; and on either side were the cats placed, with music before them on the stalls. At the signal of the ape, they regulated their mewing to sad or lively strains. One of our celebrated naturalists assures us that they *are* capable of gratitude, and may be considered faithful.

After so many instances well known, why should so severe a sentence be passed upon these animals? It is said (without proof) that education has no effect upon their natural savageness; but I cannot imagine why this should be asserted, when we notice how quietly a cat will obey its mistress, and remain by her side most of the day, if required; will run when it is called, and appear unsettled and unhappy during the absence of its protector; and how delighted when she returns, as it proves by its caresses, not acting from dissimulation or cunning. When cats have attained these social habits, they will retain them till their death; and thus brought up, they lose their inclination for mice and rats, and are devoted to those who are attached to them. From all that can be said, this conclusion may be drawn, that the more pains are bestowed upon educating them, the less they show of their natural wild state.—ARCANA OF SCIENCE, 1832.

tily playful than the kitten; but it seems to lose this disposition as it grows old, and the innate treachery of its kind is then seen to prevail. From being naturally ravenous, education teaches it to disguise its appetites, and to watch the favourable moment of plunder; supple, insinuating, and artful, it has learned the arts of concealing its intentions till it can put them into execution; when the opportunity offers, it at once seizes upon whatever it finds, flies off with it, and continues at a distance till it supposes its offence forgotten. The cat has only the appearance of attachment; and it may easily be perceived, by its timid approaches, and side-long looks, that it either dreads its master, or distrusts his kindness: different from the dog, whose caresses are sincere, the cat is assiduous rather for its own pleasure, than to please; and often gains confidence, only to abuse it.* The form of its body, and its temperament, correspond with its disposition; active, cleanly, delicate, and voluptuous, it loves its ease, and seeks the softest cushions to lie on.

The cat goes with young fifty-six days, and seldom brings forth above five or six at a time. The female usually hides the place of her retreat from the male, who is often found to devour her kittens. She feeds them for some weeks with her milk, and whatever small animals she can take by surprise, accustoming them betimes to rapine. Before they are a year old, they are fit to engender; the female seeks the male with cries; nor is their copulation performed without great pain, from the narrowness of the passage in the female. They live to about the age of ten years: and during that period, they are extremely vivacious suffering to be worried a long time before they die.

Whatever animal is much weaker than themselves, is to them an indiscriminate object of destruction. Birds, young rabbits, hares, rats and mice, bats, moles, toads and frogs, are equally pursued; though not, perhaps, equally acceptable. The mouse seems to be their favourite game; and although the cat has the sense of smelling in but a mean degree, it, nevertheless, knows those holes in which its prey resides. I have seen one of them patiently watch a whole day until the mouse appeared, and continue quite motionless until it came within reach, and then seized it with a jump. Of all the marks by which the cat discovers its natural malignity, that of playing and sporting with its little captive, before killing it outright, is the most flagrant.

The fixed inclination which they discover for this peculiar manner of pursuit, arises from the conformation of their eyes. The pupil in man, and in most other animals, is capable but of a small degree of contraction and dilatation; it enlarges a little in the dark, and contracts when the light pours in upon it, in too great quantities. In the eyes of cats, however, this contraction and dilatation of the pupil, is so considerable, that the pupil, which by day-light appears narrow and small, like the black of one's nail, by night expands over the whole surface of the eye-ball, and as every one must have seen, their eyes seem on fire. By this peculiar conformation of their eyes, they see better in darkness than light; and the animal is thus better adapted for spying out and surprising its prey.†

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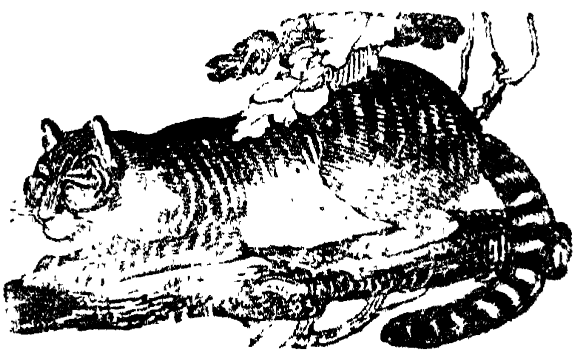
* **Attachment of Cats**—The attachment of domestic cats to human individuals, is by no means universal with the species, nor indeed, very common. But there are several instances of strong attachment to the human race on record. They have sometimes, also, great affection to other animals, which becomes a reciprocal feeling. The celebrated stallion, the Godolphin Arabian, and a black cat, were, for many years, the warmest friends. When the horse died in 1753, the cat sat upon his carcass till it was put under ground; and then crawling slowly and reluctantly away, was never seen again, till her dead body was found in a hay-loft. There was a hunter in the late King's stables at Windsor, to which a cat was so attached, that whenever he was in the stable, the creature would never leave her usual seat upon the horse's back, and to accommodate his friend, he slept, as horses will sometimes do, standing This, however, was found to injure his health; and the cat was at length removed to a distant part of the country.

† **Cats seeing in the dark.**—There are some positions so universally considered as true, that no one ever thinks of doubting them; and it is, indeed, on such, that all reasoning must be grounded: but we cannot be over scrupulous in admitting, or too nice

The cat is particularly fearful of water, of cold, and of ill smells.* It loves to keep in the sun, to get near the fire, and to rub itself against those who carry perfumes. It is excessively fond of some plants, such as valerian, marum, and cat-mint: against these it rubs, and smells them at a distance, and at last, if they be planted in a garden, wears them out.


(Wild Cat.)

"The wild cat breeds with the tame; (g) and, therefore, the latter may be considered only as a variety of the former: however, they differ in some particulars; the cat, in its savage state, is somewhat larger than the house-cat; and its fur being longer, gives it a greater appearance than it really has: its head is bigger, and face flatter; the teeth and claws much more formidable; its muscles very strong, as being formed for rapine; the tail is of a moderate length, but very thick and flat, marked with alternate bars of black and white, the end always black; the hips, and hind part of the lower joints of the leg, are always black; the fur is very soft and fine: the general colour of these animals in England is a yellowish white, mixed with a deep grey. These colours, though they appear at first sight confusedly blended together, yet, on a close inspection, will be found to be disposed like the streaks on the skin of the tiger, pointing from the back downwards, rising from a black list, that runs from the head, along the middle of the back, to the tail. This animal is found in our larger woods, and is the most destructive of the carnivorous kinds in this kingdom. It inhabits the most mountainous and woody parts of these islands, living mostly in trees, and feeding only by night. It often happens, that the females of the tame kind go into the woods to seek mates among the wild ones. It should seem that these, however, are not original inhabitants of this kingdom, but were introduced first in a domestic state, and afterwards became wild in the woods, by ill-usage or neglect. Certain it is, the cat was an animal much

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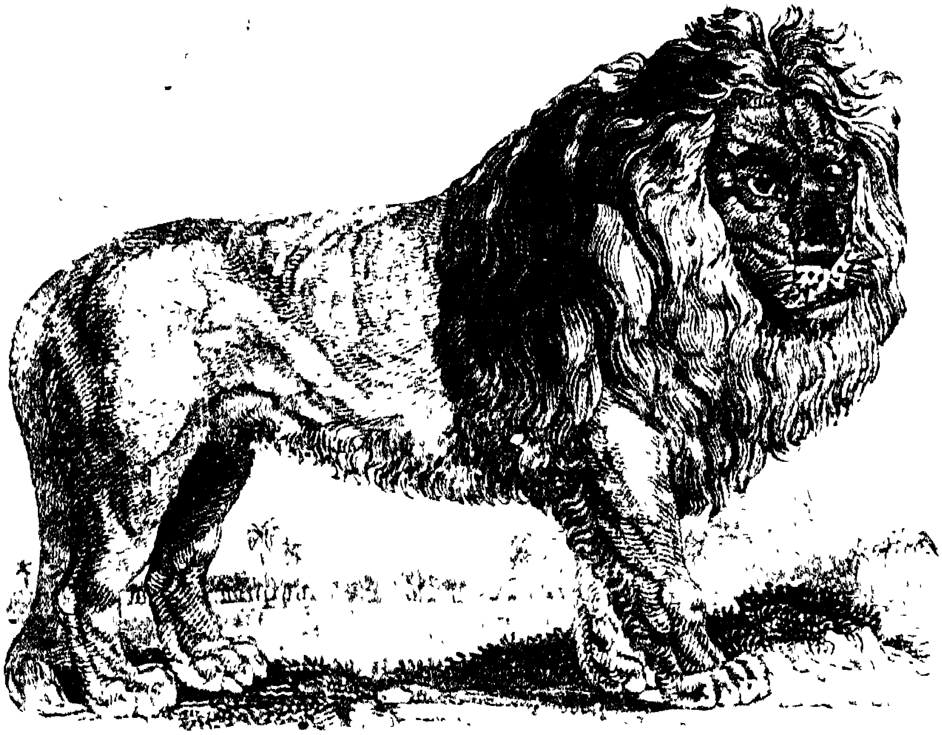
in investigating any proposition, before it is classed with those fundamental axioms as self-evident, and therefore not requiring to be demonstrated. That the pupils of cats are oval, and that therefore they are enabled to see in the dark, is an assertion very generally made, and seldom questioned: and some naturalists, observing that the felinæ vary in that particular among themselves, have separated them into diurnal and nocturnal species; distinguishing the former by the circular pupil, and the latter by that of an oval figure. It may nevertheless be doubted, whether the shape of the eye-pupil be at all connected with the extent of the power of vision: the size of it must, in all probability, be materially so; but it does not appear certain, that those animals which dilate the iris, so as to elongate the pupil, have also the greatest power of contracting the former, and consequently of enlarging the latter, more than others which have the pupil at all times circular.

The eyes of cats and of some other animals are frequently much illuminated with a prismatic sort of light in obscurity. On this subject, says Sir Everard Home, there are two opinions: one, that the external light only is reflected, and the other, that light is generated in the eye.—GRIFFITH, *in Cuvier's Animal Kingdom.*

* ANTIPATHY TO WATER.—We have seen a cat overcome her natural reluctance to wet her feet, and seize an eel out of a pail of water; the passionate longing of the domestic cat for that food is thus evinced. Dr. Darwin alludes to this propensity: "*Mr* Leonard, a very intelligent friend of mine, saw a cat catch a trout by darting upon it in a deep, clear water at the mill of Weaford, near Lichfield. The cat belonged to Mr. Stanley, who had often seen her catch fish in the same manner in summer, when the mill pool was drawn so low, that the fish could not be seen. I have heard of other cats taking fish in shallow water, as they stood on the bank. This seems to be a natural method of taking their prey, usually lost by domestication, though they all retain a strong relish for fish."

(g) British Zoology.



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THE LION SEIZING THE HORSE

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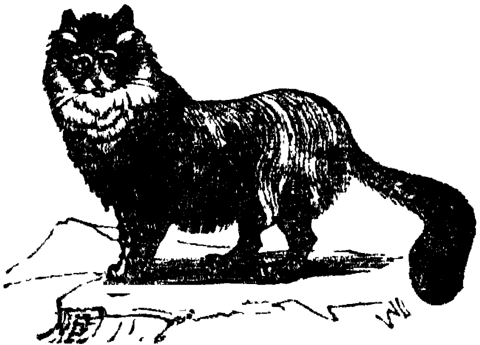
higher in esteem among our ancestors than it is at present. By the laws of Howel, the price of a kitten, before it could see, was to be a penny; till it caught a mouse, two-pence; and when it commenced mouser, four-pence: it was required, besides, that it should be perfect in its senses of hearing and seeing, be a good mouser, have the claws whole, and be a good nurse. If it failed in any of these qualities, the seller was to forfeit to the buyer the third part of its value. If any one stole or killed the cat that guarded the prince's granary, he was to forfeit a milch ewe, its fleece and lamb, or as much wheat as, when poured on the cat suspended by the tail (the head touching the floor) would form a heap high enough to cover the tip of the former. From hence we discover, besides a picture of the simplicity of the times, a strong argument that cats were not naturally bred in our forests. An animal that could be so easily taken, could never have been rated so highly; and the precautions laid down to improve the breed would have been superfluous, in a creature that multiplies to such an amazing degree.

" In our climate, we know but one variety of the wild cat; and, from the accounts of travellers, we learn that there are but very few differences in this quadruped in all parts of the world. The greatest difference, indeed, between the wild and the tame cat, is rather to be found internally than in their outward form."

This animal is one of those few which are common to the new continent, as well as the old. When Christopher Columbus first discovered that country, a hunter brought him one which he had discovered in the woods: it was of the ordinary size, the tail very long and thick. They were common also in Peru, although they were not rendered domestic. They are well known also in several parts of Africa, and many parts of Asia. In some of these countries they are of a peculiar colour, and inclining to blue. In Persia, Pietro della Valle informs us, that there is a kind of cat, particularly in the province of Chorazan, of the figure and form of the ordinary one, but infinitely more beautiful in the lustre and colour of its skin. It is of a grey blue, without mixture, and as soft and shining as silk. The tail is very long, and covered with hair six inches long, which the animal throws upon its back, like the squirrel. These cats are well known in France; and have been brought over into England, under the name of the *blue cat*, which, however, is not their colour.


(Persian Cat.)

Another variety of this animal is called by us the *lion cat*; or, as others more properly term it, the Cat of Angora. These are larger than the common cat, and even than the wild one. Their hair is much longer, and hangs about their head and neck, giving this creature the appearance of a lion. Some of these are white, and others of a dun colour. These come from Syria and Persia, two countries which are noted for giving a long, soft hair to the animals which are bred in them. The sheep, the goats, the dogs and the rabbits of Syria, are all remarkable for the fine glossy length and softness of their hair; but particularly the cat, whose nature seems to be so inflexible, conforms to the nature of the climate and soil, loses its savage colour, which it preserves almost in every other part of the world, and assumes the most beautiful appearance. There are some other varieties in this animal, but rather in colour than in form; and, in general, it may be remarked, that the cat, when carried into other countries, alters but very little, still preserving its natural manners, habits, and conformation.*

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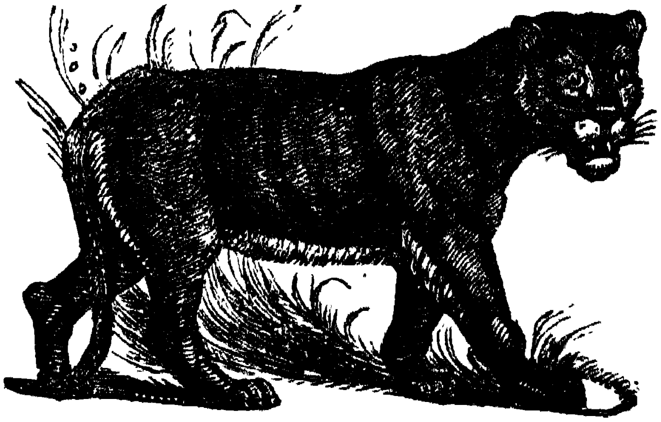
* WHITE CATS.—In a recent number of *Loudon's Gardeners' Magazine*, it is stated that white cats with blue eyes are always deaf, of which extraordinary fact there is the following confirmation in the *Magazine of Natural History*, No. 2, likewise conducted by Mr. Loudon:—Some years ago a white cat of the Persian kind (probably not a thorough-bred one) procured from Lord Dudley's at Hindley, was kept in a family as a favour-



(Lioness.)

THE LION.—The influence of climate upon mankind is very small; (g) he is found to subsist in all parts of the earth, as well under the frozen poles, as beneath the torrid zone: but in animals, the climate may be considered as congenial, and a kind of second nature. They almost all have their particular latitudes, beyond which they are unable to subsist; either perishing with a moderate cold, or dying for want of a frozen air, even in a temperate climate. The rein-deer is never seen to depart from the icy fields of the north; and, on the contrary, the lion degenerates when taken from beneath the line. The whole earth is the native country of man; but all inferior animals have each their own peculiar districts.

Most terrestrial animals are found larger, fiercer, and stronger in the warmer than in the cold or temperate climates. They are also more courageous and enterprising; all their dispositions seeming to partake of the ardour of their native soil. The lion, produced under the burning sun of Africa, is of all others the most terrible, the most undaunted. The wolf or the dog, instead of attempting to rival him, scarce deserve to attend his motions, or become his providers. Such, however, of these animals as are bred in a more temperate climate, or towards the tops of cold and lofty mountains, are far more gentle, or, to speak

ite. The animal was a female, quite white, and perfectly deaf. She produced, at various times, many litters of kittens, of which generally, some were quite white, others more or less mottled, tabby, &c. But the extraordinary circumstance is, that of the offspring produced at one and the same birth, such as, like the mother, were entirely white, were, like her, invariably deaf; while those that had the least speck of colour on their fur, as invariably possessed the usual faculty of hearing.—Arcana of Science, 1829.

Peculiarity in the Domestic Cat.—A remarkable one is the property of which its fur possesses of yielding electric sparks by rubbing. In frosty weather this is occasionally very extraordinary. Mr. White says, speaking of the frost of 1785, "During these two Siberian days, my parlour cat was so electric, that had a person stroked her, and been properly insulated, the shock might have been given to a whole circle of people."

Vulgar Error.—It is a very prevalent notion that cats are so fond of sucking the breath of infants, and consequently of producing disease and death. Upon the slightest reflection, nothing can be more obvious than that it is impossible for a cat to suck an infant's breath, at least so as to do it any injury; for even on the supposition that they did so, the construction of their mouth must preclude them from interrupting the process of breathing by the mouth and the nose at the same time. The vulgar notion must have arisen from cats nestling about infants in beds and cradles, to procure warmth. Cats, as Goldsmith has remarked in the text, are particularly solicitous to be comfortably placed as to temperature.—In winter they get before the fire to sleep; in summer they seek the shade of a tree, where the air is cool and refreshing. —Ed.

New Species of Cat.—A Naturalist in this country was lately informed by Professor Kretschmen of Frankfort, that he was in expectation of receiving from Nubia the skin and jaws of a new species of cat, larger than the lion, of a brownish colour, and without a mane. The invoice of the articles from Cairo was already received, but the objects themselves had not arrived. This will probably prove to be the maneless lion of the ancients, known to them by their acquaintance with Upper Egypt: and not unfrequently observed in the hieroglyphic sculptures of that country.

(g) This description is principally taken from Mr. Buffon: such parts as are added from others I have marked with commas.

more properly, far less dangerous than those bred in the torrid valleys beneath. The lions of Mount Atlas, the tops of which are covered in eternal snows, have neither the strength nor the ferocity of the lions of Bildulgerid or Zaara, where the plains are covered with burning sands. It is particularly in these frightful deserts, that those enormous and terrible beasts are found, that seem to be the scourge and the terror of the neighbouring kingdoms. Happily, indeed, the species is not very numerous; and it seems to be diminishing daily; for those who have travelled through these countries assure us, that there are by no means so many there at present as were known formerly; and Mr. Shaw observes, that the Romans carried fifty times as many lions from Lybia, in one year, to combat in their amphitheatres, as are to be found in the whole country at this time. The same remark is made with regard to Turkey, to Persia, and the Indies; where the lions are found to diminish in their numbers every day. Nor is it difficult to assign the cause of this diminution: it is obvious that it cannot be owing to the increase of the force of other quadrupeds, since they are all inferior to the lion, and, consequently, instead of lessening the number, only tend to increase the supplies on which they subsist; it must, therefore, be occasioned by the increase of mankind, who is the only animal in nature capable of making head against these tyrants of the forest, and preventing their increase. The arms even of a Hottentot or a negro make them more than a match for this powerful creature; and they seldom make the attack, without coming off victorious.* Their usual manner is to find out his retreat, and, with spears headed with iron, to provoke him to the combat: four men are considered as sufficient for this encounter; and he against whom the lion flies, receives him upon his spear, while the others attack him behind; the lion, finding himself wounded in the rear, turns that way, and thus gives the man he first attacked an opportunity to recover.† In this manner they attack him on all sides; until at last they en-

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* **Courage of the Lion.**—Whatever may be the extraordinary physical strength of the lion, his courage is not great. The natural habits of the animal are those of treachery; the lion is not disposed, under any circumstances to meet its prey face to face; and he is particularly unwilling to encounter man when he crosses him in the full blaze of day. The inability of his eyes (in common with those of the cat tribe) to bear a strong light, will probably account in a great degree for the circumstance, which has probably brought upon him much of the reproach of being a skulking, cowardly animal. But we apprehend that there were periods in the history of African colonization, when the lion was of a bolder nature in his encounters with mankind; that the dread of fire-arms has become, in some degree, a habit of the species; and that has sagacity, or hereditary instinct, to know that a flash and a loud sound is often followed by a speedy death or a grievous injury.

† **Lion Hunt in Africa.**—We here give an account of a lion hunt on the eastern frontier of the Cape Colony, furnished by one of the most pleasing writers of the day; and we should deprive his account of its interest, if we attempted to give it in any other than his own words.

"One night a lion, that had previously purloined a few sheep out of my kraal, came down and killed my riding horse, about a hundred yards from the door of my cabin. Knowing that the lion, when he does not carry off his prey, usually conceals himself in the vicinity, and is very apt to be dangerous by prowling about the place in search of more game, I resolved to have him destroyed or dislodged without delay. I, therefore, sent a messenger round the location, to invite all who were willing to assist in the enterprise, to repair to the place of rendezvous as speedily as possible. In an hour every man of the party (with the exception of two pluckless fellows, who were kept at home by the women) appeared ready mounted and armed. We were also reinforced by about a dozen of the 'Bastaard,' or Mulatto Hottentots, who resided at that time upon our territory as tenants or herdsmen; an active and enterprising, though rather an unsteady race of men. Our friends, the Tarka boors, many of whom are excellent lion hunters, were all too far distant to assist us, our nearest *neighbours* residing at least twenty miles from the location. We were, therefore, on account of our own inexperience, obliged to make our Hottentots the leaders of the chase. The first point was to track the lion to his covert. This was effected by a few Hottentots on foot. Commencing from the spot where the horse was killed, they followed the *spoor* (footmark) through the grass and gravel and brushwood, with astonishing ease and dexterity, where an inexperienced eye could discern neither foot print nor mark of any kind, until, at length, we fairly tracked him into a large *bosch*, or

tirely disable, and then dispatch him. This superiority in the numbers, and the arts of man, they are sufficient to conquer the lion, serve also to enervate and

straggling thicket of brushwood and evergreens, about a mile distant.

" The next object was to drive him out of this retreat, in order to attack him in close phalanx, and with more safety and effect. The approved mode in such cases is to torment him with dogs till he abandons his covert, and stands at bay in the open plain. The whole band of hunters then march forward together, and fire deliberately, one by one. If he does not speedily fall, but grows angry and turns upon his enemies, they must then stand close in a circle, and turn their horses' rear outward; some holding them fast by the bridles, while the others kneel to take a steady aim at the lion as he approaches, sometimes up to the very horses' heels—crouching every now and then, as if to measure the distance and strength of his enemies. This is the moment to shoot him in the forehead. If they continue to wound him ineffectually, till he waxes furious and desperate, or if the horses, startled by his terrific roar, grow frantic with terror and burst loose, the business becomes rather serious.

" In the present instance, we did not manage matters quite so scientifically. The Bastaards, after recounting to us all these and other sage laws of lion-hunting, were themselves the first to depart from them. Finding the few indifferent hounds we had made little impression on the enemy, they divided themselves into two or three parties, and rode round the jungle, firing into the spot where the dogs were barking round him, but without effect. At length, after some hours in thus beating about the bush, the Scottish blood of some of my countrymen began to be impatient; and three of them announced their determination to march in and beard the lion in his lair, provided three of the bastaards, who were superior marksmen, would support them, and follow up their fire should the enemy venture to give battle. Accordingly in they went, to within fifteen or twenty paces of the spot. He was couched among the roots of a large evergreen bush, with a small space of open ground on one side of it; and they fancied, on approaching, that they saw him distinctly, lying glaring from under the foliage. Charging the Bastaards to stand firm and level fair should they miss, the Scottish champions let fly together, and struck—not the lion, as it afterwards proved, but a great block of red stone, beyond which he was actually lying. Whether any of the shot grazed him is uncertain, but, with no other warning than a furious howl, forth he bolted from the bush. The pusillanimous Bastaards, in place of pouring in their volley upon him, instantly turned, and fled helter-skelter, leaving him to do his pleasure upon the defenceless Scots, who, with empty guns, were tumbling over each other in their hurry to escape the clutch of the rampant savage. In a twinkling he was upon them, and with one stroke of his paw dashed the nearest to the ground. The scene was terrific! There stood the lion, with his foot upon his prostrate foe, looking round in conscious power and pride upon the bands of his assailants, and with a front the most noble and imposing that can be conceived; it was the most magnificent thing I ever witnessed. The danger of our friends, however, rendered it at the moment too terrible to enjoy either the grand or the ludicrous part of the scene. We expected every instant to see one or more of them torn to pieces; nor, though the rest of the party were standing within fifty paces with their guns cocked and levelled, durst we fire for their assistance. One was lying under the lion's paw, the rest were scrambling towards us in such a way as to intercept our aim. All this passed more rapidly than I have described it. But luckily the lion, after steadily surveying us for a few seconds, seemed willing to be quits with us on fair terms, and with a fortunate forbearance (for which he met an ungrateful recompense) turned calmly away, and driving the snarling dogs like rats from among his heels, bounded over the adjoining thicket like a cat over a footstool, clearing brakes and bushes twelve or fifteen feet high as readily as if they had been tufts of grass, and abandoning the jungle, retreated towards the mountains.

" After ascertaining the state of our rescued comrade (who fortunately had sustained no other injury than a slight scratch on the back, and a severe bruise in the ribs,) we renewed the chase, with the Hottentots and hounds in full cry. In a short time we again came up with the enemy, and found him at bay under an old mimosa tree, by the side of a mountain stream, which we had distinguished by the name of Douglas Water. The dogs were barking round, but afraid to approach him, for he was now beginning to growl fiercely, and to brandish his tail in a manner that showed he was meditating mischief. The Hottentots, by taking a circuit between him and the mountain, crossed the stream, and took a position on the top of a precipice overlooking the spot where he stood. Another party of us occupied a position on the other side of the glen; and placing the poor fellow thus between two fires, which confused his attention and prevented his retreat, we kept battering away at him till he fell unable again to grapple with us, pierced with many wounds. He proved to be a full-grown discourage him; for he is brave only in proportion to the success of his former encounters. In the vast deserts of Zaara, in the burning sands that lie between Mauritania and Negroland, in the uninhabited countries that lie to the north of Caffraria, and, in general, in all the deserts of Africa, where man has not fixed his habitation, the lions are found in great numbers, and preserve their natural courage and force. Accustomed to measure their strength with every animal they meet, the habit of conquering renders them intrepid and terrible. Having never experienced the dangerous arts and combinations of man, they have no apprehensions from his power. They boldly face him, and seem to brave the force of his arms. Wounds rather serve to provoke their rage than repress their ardour. They are not daunted even with the opposition of numbers; a single lion of the desert often attacks an entire caravan; and after an obstinate combat, when he finds himself overpowered, instead of flying, he continues to combat, retreating, and still facing the enemy till he dies. On the contrary, the lions which inhabit the peopled countries of Morocco or India, having become acquainted with human power, and experienced man's superiority, have lost all their courage, so as to be scared away with a shout; and seldom attack any but the unresisting flocks or herds, which even women and children are sufficient to protect.

This alteration in the lion's disposition sufficiently shows that he might easily be tamed, and admit of a certain degree of education. "In fact, nothing is more common than for the keepers of wild beasts to play with this animal, to pull out his tongue, and even to chastise him without a cause. He seems to bear it all with the utmost composure; and we very rarely have instances of his revenging these unprovoked sallies of impertinent cruelty. However, when his anger is at last excited, the consequences are terrible. Labat tells us of a gentleman who kept a lion in his chamber, and employed a servant to attend it, who, as is usual, mixed his blows with caresses. This ill-judged association continued for some time; till one morning the gentleman was awakened by a noise in his room, which at first he could not tell the cause of; but, drawing the curtains, he perceived a horrid spectacle, the lion growling over the man's head, which he had separated from the body, and tossing it round the floor. He immediately, therefore, flew into the next room, called to the people without, and had the animal secured from doing further mischief." However, this single account is not sufficient to weigh against the many instances we every day see of this creature's gentleness and submission. He is often bred up with other domestic animals, and is seen to play innocently and familiarly among them; and if it ever happens that his natural ferocity returns, it is seldom exerted against his benefactors. As his passions are strong, and his appetites vehement, one ought not to presume that the impressions of education will always prevail; so that it would be dangerous in such circumstances to suffer him to remain too long without food, or to persist in irritating and abusing him: however, numberless accounts assure us that his anger is noble, his courage magnanimous, and his disposition grateful. He has been often seen to despise contemptible enemies, and pardon their insults when it was in his power to punish them. He has been seen to spare the lives of such as were thrown to be devoured by him, to live peaceably with them, to afford them a part of his subsistence, and sometimes to want food himself rather than deprive them of that life which his generosity had spared.*

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lion, of the yellow variety, about five or six years of age."—PRINGLE'S *Ephemerides*, *note*.

* LION FIGHTS AT WARWICK.—Some years ago a great lion fight took place, which attracted considerable attention at the time. Nero, was the name of the first lion selected for the encounter, a remarkably mild animal, and Wallace, of a fierce disposition, was reserved for the second exhibition. The mode of training the first was emollient, soft, and enervating; Wallace was calculated to inspire the natural spirit of his kind; yet, in their cages, they could scarcely ever be supposed to arrive at the natural powers of the "forest's monarch."

The fights took place in the yard of the Old Factory at Warwick, in August, 1825, in an iron cage, or den, on wheels, with bars to permit the ingress and egress of the dogs

It may also be said that the lion is not cruel, since he is so only from necessity, and never kills more than he consumes. When satiated, he is perfectly gentle; while the tiger, the wolf, and all the inferior kinds, such as the fox, the pole-cat, and the ferret, kill without remorse, are fierce without cause, and, by their indiscriminate slaughter, seem rather to satisfy their malignity than their hunger.

The outward form of the lion seems to speak his internal generosity. His figure is striking, his look confident and bold, his gait proud, and his voice terrible. His stature is not overgrown, like that of the elephant or rhinoceros; nor is his shape clumsy, like that of the hippopotamus or the ox. It is compact, well-proportioned, and sizeable; a perfect model of strength joined with agility. It is muscular and bold, neither charged with fat nor unnecessary flesh. It is sufficient but to see him in order to be assured of his superior force. His large head surrounded with a dreadful mane; all those muscles that appear under the skin swelling with the slightest exertions; and the great breadth of his paws, with the thickness of his limbs, plainly evince that no other animal in the forest is capable of opposing him. He has a very broad face that, as some have imagined, resembles the human. It is surrounded with very long hair, which gives it a very majestic air. The top of the head, the temples, the cheeks, the under jaw, the neck, the breast, the shoulder, the hinder part of the legs, and the belly, are furnished with it, while all the rest of the body is covered with very short hair, of a tawny colour. "The length of the hair in many parts, and the shortness of it in others, serves a good deal to disguise this animal's real figure. The breast, for instance, appears very broad; but in reality it is as narrow and contracted in proportion as that of the generality of dogs and horses. For the same reason, the tail seems to be of an equal thickness from

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from a platform nearly level with the bottom of the cage. On this platform the dog-fighters performed their part in the exhibition.

For the first encounter, the dogs were six in number. Every thing being prepared, Turk, Captain, and Tiger, three of the dogs, were let loose on the lion. They repeatedly pinned him by the lip and nose. Nero pawed them off, and struck his talons into their sides, but he had no chance against his canine assailants. Three several assaults took place, in which the lion was worsted, and the proprietor reluctantly acknowledged it had no chance.

It is evident that the domestic state in which the lion had been brought up, completely disqualified him from the combat. He had no confidence in himself, and may be said rather to have resisted persecution than to have fought the dogs.

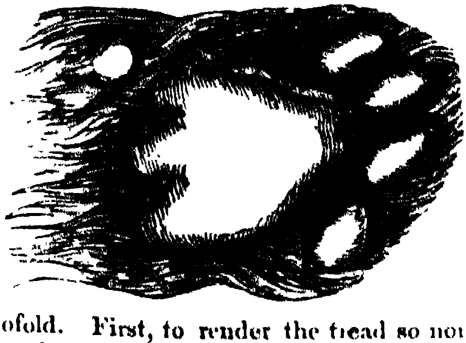
The moment the dogs were taken away, the poor fellow stood up, evidently worn out in spirit and in body; the blood flowed copiously from his wounds, and as he paced slowly backwards and forwards, he seemed to have been in terror every moment lest the attack should be renewed. With the exception of one, all the dogs quickly recovered and did well, although they bore strong marks of the mischief which their noble antagonist might have done, had he been conscious of his powers. The other was dreadfully mangled, and we believe did not survive.

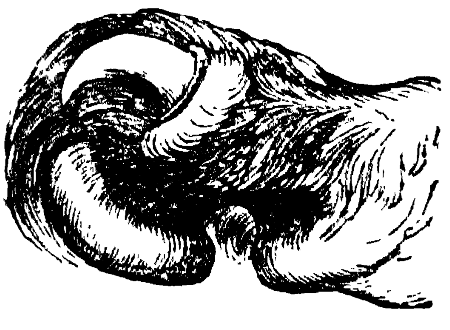
A few days afterwards, the *second fight* took place, against Wallace, who was nearly six years old, and received his name from the circumstance of his being cubbed in Scotland, where we remember carrying him in our arms, shortly after his birth. His foster-mother was a bull-bitch; he weighed 400 lbs., which more than counterbalanced all the dogs sent against him. When the first pair of dogs were let loose, he sat upon his haunches during the attack. He showed himself a forest lion, and fought like one He took up the first dog with his teeth, and deliberately walked round the cage with him. as a cat would with a mouse. He then dropped the dog, which went yelping off, and took up its neighbour in precisely the same manner. Had not one of the keepers rescued it through the bars, it evidently would have been demolished. The second and third pair of dogs were set on, but the noble animal, like the dew drop on its mane, "shook them to air," and something worse too for one or two of the canine heroes. As soon as the cage was cleared of his opponents, Wallace, seemingly disappointed of his prey, betrayed much anger, by lashing his sides with his tail, and roaring tremendously. His jaws were covered with crimson foam, and he strode the arena with the greatest majesty, printing each step with gore. Two of the dogs in this combat died, and a third, we believe, scarce survived.

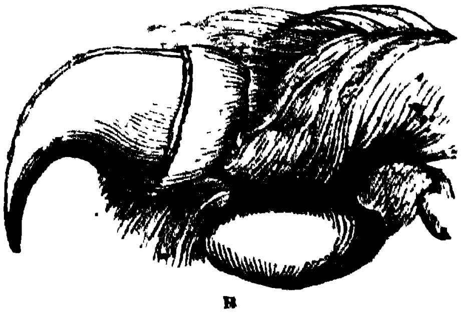
This is not the first lion-fight in this country. James I., on his ascending the English throne, saw one of those noble animals for the first time in his life; and attended the Tower, full of wonder and admiration, to be present at an attack of dogs on it, accompanied by his son Charles of pious memory.—Ed.

one end to the other, on account of the inequality of the hair with which it is encompassed; it being shorter near the insertion, where the flesh and bones are large, and growing longer in proportion as its real thickness lessens towards the point, where it ends in a tuft. The hair about the neck and breast is not different from that on the rest of the body, except in the length of it; nor is each hair pointed as in most other animals, but of an equal thickness from one end to the other. The neck is very strong, but not composed of one solid bone, as Aristotle has imagined; on the contrary, though very short and muscular, it has as many bones as the camel or the horse; for it is universal to all quadrupeds to have seven joints in the neck; and not one of them have either more or less. However, the muscles in the neck of the lion, that tie the bones together, are

Lion's Paw and Claws.—It is time, however, that we pass on to consider some of the mechanical contrivances in the structure of the organs of this animal, which display the most admirable design and skill. The bones of the fore limbs of the lion are remarkable for their strength and firmness, and the muscles for their denseness and extraordinary developement; nor are those of the jaws and neck less powerful. On stripping the skin from these parts, we have one of the finest displays of the "beau ideal" of muscular developement which it is possible to conceive. The tongue is rough, with horny papillæ, the sense of taste being probably somewhat dull. The hearing is highly acute, and the sight adapted for nocturnal vision. But it is in the mechanism of the paws that we are presented with a most elaborate piece of work. Let it be borne in mind that the lion, as we have said, creeps *silently* towards his prey, and then bounds upon it with a spring of *twenty* or *thirty feet*, bearing it to the earth with the irresistible impetus. Now, if we take one of the fore paws and examine it, we find it *softly cushioned* below, no formidable *talon visible*, and the whole mass *heavy* but *sinewy* and *flexible*. That a sinewy and flexible structure with great strength is needed by an animal which bounds upon its prey, and whose habits require a free and active foot, is at once apparent; but why, in addition, is the sole padded with a soft, springy cushion of granular fat, two inches in thickness, with a similar but smaller one on the base of each toe? The design of these springy pads, (represented in the accompanying sketch, which we have taken expressly for the purpose,) is twofold. First, to render the tread so noiseless, that no foot-fall may alarm the quick-eared prey; and secondly, that the jar or concussion produced by the violence of the bound may be broken, so that neither the shoulder nor spine shall receive a shock from the forcible descent of so heavy a body propelled by powers so amazing. And why are not the talons visible? These are drawn back into sheaths, so that the point of each only just peeps out, but hid beneath the fur, and elevated far above the ground by the pulpy pad below, in order that they may be unworn and unblunted, so as ever to be ready for service: by a curious contrivance they can be sheathed and unsheathed at pleasure. Thus the lion at play with his cubs or mate, uses an unarmed paw in his gambols, and only throws out these formidable weapons when he strikes in anger. By a single blow he can rip up the side of a horse or buffalo. Our annexed sketch represents one of the toes, A, with the claw sheathed, the hair being a little thrown back so as to leave the point visible, which would otherwise be quite covered: the same toe, B, with the claw unsheathed, as in the act of striking, is given below..







B

extremely strong, and have somewhat the appearance of bones; so that ancient authors, who have treated of this animal, have mistaken the whole for a single bone. The tongue is rough, and beset with prickles as hard as a cat's claws; these have the grain turned backwards, so that it is probable a lion, if it should attempt to lick a man's hand, as we are told it sometimes does, would tear off the skin. The eyes are always bright and fiery; nor even in death does this terrible look forsake them. In short, the structure of the paws, teeth, eyes, and tongue are the same as in a cat; and also in the inward parts these two animals so nearly resemble each other, that the anatomist's chief distinction arises merely from the size."

The lion has, as was observed before, a large mane, which grows every year longer as the animal grows older: the lioness is without this ornament at every age. This mane is not coarse or rough as in a horse, but composed of the same hair with the rest of the body, lengthened and shining. The mane, as well as the rest of the body, is of a yellow colour; nor is there ever any difference to be found in the colour of one lion from that of another. What the ancients might have said concerning black lions, or white, or streaked like the tiger, is not confirmed by modern experience; so that these varieties have never been seen, or exist no longer.

It is usually supposed that the lion is not possessed of the sense of smelling in such perfection as most other animals. It is also observed, that too strong a light greatly incommodes him. This is more than probable, from the formation of his eyes, which, like those of the cat, seem fitted for seeing best in the dark. For this reason, he seldom appears in open day, but ravages chiefly by night; and not only the lion, but all other animals of the cat kind, are kept off by the fires which the inhabitants light to preserve their herds and flocks; the brightness of the flame dazzles their eyes, which are only fitted for seeing in the dark; and they are afraid to venture blindly into those places which they know to be filled with their enemies. "It is equally true of all this kind, that they hunt rather by the sight than the smell; and it sometimes happens that the lion pursues either the jackall or the wild dog, while they are hunting upon the scent; and when they have run the beast down, he comes in, and monopolizes the spoil. From hence, probably, may have arisen the story of the lion's provider: these little industrious animals may often, it is true, provide a feast for the lion; but they have hunted merely for themselves, and he is an unwelcome intruder upon the fruits of their toil."

The lion, when hungry, boldly attacks all animals that come in his way; but as he is very formidable, and as they all seek to avoid him, he is often obliged to hide, in order to take them by surprise. For this purpose he crouches on his belly, in some thicket, or among the long grass, which is found in many parts of the forest: in this retreat he continues, with patient expectation, until his prey comes within a proper distance, and he then springs after it, fifteen or twenty feet from him, and often seizes it at the first bound. If he misses the effort, and in two or three reiterated springs cannot seize his prey, he continues motionless for a time, seems to be very sensible of his disappointment, and waits for a more successful opportunity. In the deserts and forests, his most usual prey are the gazelles and the monkeys, with which the torrid regions abound. The latter he takes when they happen to be upon the ground, for he cannot climb trees like the cat or the tiger. He devours a great deal at a time, and generally fills himself for two or three days to come. His teeth are so strong that he very easily breaks the bones, and swallows them with the rest of the body. It is reported that he sustains hunger a very long time, but thirst he cannot support in an equal degree, his temperament being extremely hot; some have even asserted that he is in a continual fever. He drinks as often as he meets with water, lapping it like a cat; which, as we know, drinks but slowly. He generally requires about fifteen pounds of raw flesh in a day; he prefers that of live animals, and particularly those which he has just killed. He seldom devours the bodies of animals when they begin to putrefy; and he chooses rather to hunt for a fresh spoil, than to return to that which he had half devoured before.

However, though he usually feeds upon fresh provision, his breath is very offensive, and his urine insupportable.

The roaring of the lion is so loud, that when it is heard in the night, and re-echoed by the mountains, it resembles distant thunder. This roar is his natural note; for when enraged he has a different growl, which is short, broken, and reiterated. The roar is a deep, hollow growl, which he sends forth five or six times a day, particularly before rains. The cry of anger is much louder and more formidable. This is always excited by opposition; and upon those occasions, when the lion summons up all his terrors for the combat, nothing can be more terrible. He then lashes his sides with his long tail, which alone is strong enough to lay a man level.* He moves his mane in every direction; it seems to rise and stand like bristles round his head; the skin and muscles of his face are all in agitation; his huge eyebrows half cover his glaring eye-balls; he discovers his teeth, which are formed rather for destruction than chewing his food; he shows his tongue covered with points, and extends his claws, which appear almost as long as a man's fingers. Prepared in this manner for war, there are few animals that will venture to engage him; and even the boldest of the human kind are daunted at his approach. The elephant, the rhinoceros, the tiger, and the hippopatamus, are the only animals that are not afraid singly to make opposition.

"Nevertheless, neither the leopard nor the wild boar, if provoked, will shun the combat; they do not seek the lion to attack, but will not fly at his approach; they wait his onset, which he seldom makes, unless compelled by hunger; they then exert all their strength, and are sometimes successful. We are told of the combat of a lion and a wild boar, in a meadow near Algiers, which continued for a long time with incredible obstinacy. At last, both were seen to fall by the wounds they had given each other; and the ground all about them was covered with their blood. These instances, however, are very rare, for the lion is in general the undisputed master of the forest. Man is the only creature that attacks him with almost certain success; with the assistance of dogs and horses which are trained to the pursuit. These animals that, in a state of nature, would have fled from the presence of the lion in an agony of consternation, when conscious of the assistance of man, become pursuers in turn, and boldly hunt their natural tyrant. The dogs are always of the large breed; and the horses themselves, as Gesner assures us, must be of that sort called Charossi, or lion-eyed, all others of this kind flying at the sight of the lion, and endeavouring to throw their riders. When the lion is roused, he recedes with a slow, proud motion; he never goes off directly forward, nor measures his paces equally, but takes an oblique course, going from one side to the other, and bounding rather than running. When the hunters approach him, they either shoot or throw their javelins; and in this manner disable him before he is attacked by the dogs, many of whom he would otherwise destroy. He is very vivacious, and is never killed at once, but continues to fight desperately, even after he has received his mortal blow. He is also taken by pit-falls; the natives digging a deep hole in the ground, and covering it slightly over with sticks and earth; which, however, give way beneath his weight, and he sinks to the bottom, from whence he has no means of escape. But the most usual manner of taking this animal is while a cub, and incapable of resistance. The place near the den of the lioness is generally well known by the greatness of her depredations on that occasion; the natives, therefore, watch the time of her absence, and aided by a swift horse, carry off her cubs, which they sell to strangers, or to the great men of their country."

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* Prickle in the Lion's Tail.—Two lions, which died some months ago in the menagerie of the King's Garden at Paris, have furnished an occasion of verifying a curious fact, mentioned in some old works, but which modern authors have generally omitted. It is, that there exists at the extremity of the lion's tail a small claw, concealed in the midst of the tuft of long, black hairs which occur there. It is a horny production, about two lines in length, which presents itself under the form of a small cone, a little curved, and adhering by its base to the skin only, and not to the last vertebra, which is separated from it by a space of two or three lines; this small spur exists in both sexes. The commentators of Homer thought they could explain, by the presence of this prickle, a curious and correct remark made by the author of the Iliad, which was, that the lion is the only animal which, when violently irritated, agitates its tail, and strikes its sides with it. They imagined that the lion sought to excite himself by pricking his sides with the horny production in question. Blumenbach, some years ago, verified the existence of this prickle; but the pamphlet in which his observations were contained has remained unnoticed by naturalists; and the curious fact of which we speak might long have remained unknown, had not M. Deshayes happened to see the pamphlet in question, and engaged the naturalists, who more particularly study the mammifera, to make some observations on the subject. This prickle, or spur, adhering only to the skin, at the circumference of its base, is very easily detached. It has not yet been observed whether it exists equally in the other large species of the genus felis.—Edin. New Phil. Journ.

The lion, while young and active, lives by hunting in the forest, at the greatest distance from any human habitation, and seldom quits this retreat while able to subsist by his natural industry; but when he becomes old, and unfit for the purposes of surprise, he boldly comes down into places more frequented, attacks the flocks and herds that take shelter near the habitation of the shepherd or the husbandman, and depends rather upon his courage than his address for support. It is remarkable, however, that when he makes one of these desperate sallies, if he finds men and quadrupeds in the same field, he only attacks the latter, and never meddles with men, unless they provoke him to engage. It is observed that he prefers the flesh of camels to any other food; he is likewise said to be fond of that of young elephants; these he often attacks before their trunk is yet grown; and, unless the old elephant comes to their assistance, he makes them an easy prey.

The lion is terrible upon all occasions, but particularly at those seasons when he is incited by desire, or when the female has brought forth. It is then that the lioness is seen followed by eight or ten males, who fight most bloody battles among each other, till one of them becomes victorious over all the rest. She is said to bring forth in spring, and to produce but once a year. "With respect to the time of gestation, naturalists have been divided; some asserting that the lioness went with young six months, and others but two. The time also of their growth and their age have hitherto been left in obscurity; some asserting that they acquired their full growth in three years, and others that they required a longer period to come to perfection; some saying (and among this number is Mr. Buffon) that they lived to but twenty or twenty two years at most; others making their lives even of shorter duration. All these doubts are now reduced to certainty; for we have had several of these animals bred in the Tower; so that the manner of their copulation, the time of their gestation, the number they bring forth, and the time they take to come to perfection, are all pretty well known.* Although the lion emits his urine backwards, yet he couples in the ordinary manner; and, as was said before, his internal structure in almost every respect resembles that of a cat. The lioness, however, is upon these occasions particularly fierce, and often wounds the lion in a terrible manner. She goes with young, as I am assured by her keeper, no more than five months; the young ones, which are never more than two in number when brought forth, are about the size of a large pug dog, harmless, pretty, and playful; they continue the teat for twelve months, and the animal is more than five years in coming to perfection. As to its age, from its imprisoned state, we can have no certainty; since it is very probable that, being deprived of its natural climate, food, and exercise, its life must be very much abridged. However, naturalists have hitherto been greatly mistaken as to the length of its existence. The great he-lion, called Pompey, which died in the year 1760, was known to have been in the Tower for above seventy years; and one lately died there, which was brought from the river Gambia, that died above sixty-three. The lion, therefore, is a very long-lived animal; and very probably, in his native forests, his age exceeds even that of man himself."

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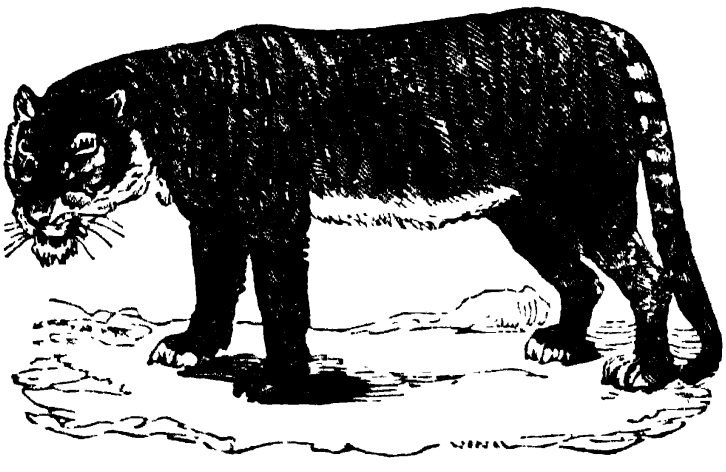
* PROCREATION.—Within a few years, the keepers of menageries have been successful in procuring the continuance of the species, from a lion and lioness in confinement. Several full-grown examples have been reared in this way in England. The cubs are always playful and harmless; but as they approach to maturity, they invariably put on the natural habits of the race, and are, generally, as little to be trifled with as those which are whelped in the woods. The nurture of these animals under confinement tends to soften their character, as in the case of one of the Warwick lions.

In this animal all the passions, even of the most gentle kind, are in excess, but particularly the attachment of the female to her young. The lioness, though naturally less strong, less courageous, and less mischievous than the lion, becomes terrible when she has got young ones to provide for. She then makes her incursions with even more intrepidity than the lion himself; she throws herself indiscriminately among men and other animals, destroys without distinction, loads herself with the spoil, and brings it home reeking to her cubs, whom she accustoms betimes to cruelty and slaughter. She usually brings forth in the most retired and inaccessible places; and when she fears to have her retreat discovered, often hides her tracks, by running back her ground, or by brushing them out with her tail. She sometimes also, when her apprehensions are great, transports them from one place to another; and, if obstructed, defends them with determined courage, and fights to the last.

The lion is chiefly an inhabitant of the torrid zone; and, as was said, is always most formidable there: nevertheless, he can subsist in more temperate climates; and there was a time when even the southern parts of Europe were infested by him. At present he is only found in Africa and the East Indies; in some of which countries he grows to an enormous height. The lion of Bildulgerid is said to be nearly five feet high, and between nine and ten feet from the tip of the nose to the insertion of the tail. The ordinary size is between three and four feet; the female being in all her dimensions about one-third less than the male.

THE TIGER.—"The ancients had a saying, *That as the peacock is the most beautiful among birds, so is the tiger among quadrupeds.* (g) In fact, no quadruped can be more beautiful than this animal; the glossy smoothness of his hair, which lies much smoother and shines with greater brightness than even that of the leopard; the extreme blackness of the streaks with which he is marked, and the bright yellow colour of the ground which they diversify, at once strike the beholder. To this beauty of colouring is added an extremely elegant form, much larger indeed than that of the leopard, but more slender, more delicate, and bespeaking the most extreme swiftness and agility.*


(Tiger.)

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* **Tiger and the Lion.**—The lion is called the "monarch of the forest," not only from his majestic appearance, but from the inference that all animals fly before him. But this title of king of the beasts, may be disputed by the tiger. Although these wild dwellers of the desert exhibit a strikingly different external appearance, yet their internal conformation is the same. The largest as well as the fiercest lions are to be found in the interior of Africa; while the tiger in the East Indies is more powerful than any met with in other parts of the world. It is the undisputed master of the Indian forest. Indeed the royal tiger of Bengal is more than a match for the Asiatic Lion. A British officer, who

(g) Ου χ'η λεοντος σκυμνον εν πολει τρεφειν.

Unhappily, however, this animal's disposition is as mischievous as its form is admirable, as if Providence was willing to show the small value of beauty, by bestowing it on the most noxious of quadrupeds."

resided many years at Sierra Leone, was repeatedly a spectator of combats between the lion and the tiger, in which the latter was universally victorious. Some years ago, Captain Stewart, in sailing up the river by the side of Sangeer Island, observed a large tiger come down to the edge of the water, and cast a very wishful look at the people on board the vessel; but, in the course of a very short space, he turned back, and was noticed to lie down under a bush, at about the distance of a quarter of a mile, or something less. Two Arabs, armed with matchlocks, desired to be put on shore, in order to kill the beast. Remonstrance was in vain, and they landed. The ferocious animal lay, like a cat, couchant, awaiting their approach. When within a short distance, it arose, and the Arabs, instead of firing, stood petrified with fear; the terrible beast lashed its sides, then sprang forward like lightning, and seizing one, carried him off instantly.

TIGER HUNT—In his delightful Journal, Bishop Heber gives a pleasing account of this adventurous sporting:

"Nov. 20. He mentioned, in the course of conversation, that there was a tiger in an adjoining tope, which had done a good deal of mischief; that he should have gone after it himself, had he (the Rajah) not thought that it would be a fine diversion for Mr. Boulderson and me. I told him I was no sportsman, but Mr. Boulderson's eyes sparkled at the name of tiger, and he expressed great anxiety to beat up his quarters in the afternoon. Under such circumstances, I did not like to deprive him of his sport, as he would not leave me by myself, and went, though with no intention of being more than a mere spectator. Mr. Boulderson advised me to load my pistols for the sake of defence, and lent me a fine double-barreled gun for the same purpose. We set out a little after three on our elephants, with a servant behind each howdah, carrying a large chattah. The Rajah, in spite of his fever, made his appearance too, saying that he could not bear to be left behind. A number of people on foot and horseback attended from our own camp and the neighbouring villages, and the same sort of interest and delight was evidently excited which might be produced in England by a great coursing party. The Rajah was on a little, female elephant, hardly bigger than a Durham ox, and almost as shaggy as a poodle.

"Mr. Boulderson had also a formidable apparatus of muskets and fowling-pieces, projecting over his mohout's head. We rode about two miles across a plain, covered with long jungly grass. Quails and wild fowl rose in great number, and beautiful antelopes were seen scudding away in all directions. At last we came to a deeper and more marshy ground, which lay a little before the tope pointed out to us; and while Mr. Boulderson was doubting whether we should pass through it, or skirt it, some country people came running to say that the tiger had been tracked there that morning. We, therefore, went in, keeping line as if we had been beating for a hare, through grass so high that it reached up to the howdah of my elephant, though a tall one, and almost hid the Rajah entirely. We had not gone far before a very large animal of the deer kind sprung up just before me, larger than a stag, of a dusky brown colour, with spreading, but not palmated horns. It was a mohr, a species of elk. A little further another rose; it was the female. The sight of these curious animals had already, however, well repaid my coming out, and from the animation and eagerness of every body round me, the anxiety with which my companions looked for every waving of the jungle grass, and the continued calling and shouting of the horse and foot behind us, it was impossible not to catch the contagion of interest and enterprise.

"At last all the elephants drew up their trunks into the air, began to roar, and to stamp violently with their fore-feet: the Rajah's little elephant turned short round, and in spite of all her mohout could say or do, took up her post close in the rear. The other three went on slowly but boldly, with their trunks raised, their ears expanded, and their sagacious little eyes bent intently forward. 'We are close upon him!' said Mr. Boulderson; 'fire where you see the long grass shake, if he rises before you.' Just at that moment my elephant stamped violently. 'There, there,' cried the mohout, 'I saw his head!' A short roar, or rather loud growl, followed, and I saw immediately before my elephant's head the motion of some large animal stealing away through the grass. I fired as directed, and, in a moment after, seeing the motion still more plainly, fired the second barrel. Another short growl followed, the motion was immediately quickened, and was soon lost in the more distant jungle. Mr. Boulderson said, 'I should not wonder if you hit him that last time; at any rate, we shall drive him out of the cover, and then I will take care of him.'

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"I asked Mr. Boulderson on our return, whether tiger-hunting was generally of this kind. 'In a jungle,' he answered, 'it must always be pretty much the same, inasmuch as, except under very peculiar circumstances, The chief and most observable distinction in the tiger, and in which it differs from all others of the mottled kind, is in the shape of its colours, which run in streaks or bands in the same direction as his ribs, from the back down to the belly. The leopard, the panther, and the ounce, are all partly covered like this animal, but with this difference, that their colours are broken in spots all over the body; whereas in the tiger they stretch lengthwise, and there is scarce a round spot to be found on his skin. Besides this, there are other observable distinctions: the tiger is much larger, and often found bigger even than the lion himself: it is much slenderer also in proportion to its size; its legs shorter, and its neck and body longer. In short, of all other animals, it most resembles the cat in shape; and if we conceive the latter magnified to a very great degree, we shall have a tolerable idea of the former.

In classing carnivorous animals, we may place the lion foremost;(*g*) and immediately after him follows the tiger, which seems to partake of all the noxious qualities of the lion, without sharing any of his good ones. To pride, courage, and strength, the lion joins greatness, clemency, and generosity; but the tiger is fierce without provocation, and cruel without necessity. The lion seldom ravages except when excited by hunger; the tiger, on the contrary, though glutted with slaughter, is not satisfied, still continues the carnage, and seems to have its courage only inflamed by not finding resistance.

Happily for the rest of nature, that this animal is not common, and that the species is chiefly confined to the warmest provinces of the East.* The tiger is found in Malabar, in Siam, in Bengal, and in all the countries which are inhabited by the elephant or the rhinoceros.† Some even pretend that it has a friendship for, and often accompanies the latter, in order to devour its excrements, which serve it as a purge. Be this as it will, there is no doubt but that they are often seen together at the sides of lakes and rivers; where they are probably both compelled to go by the thirst which in that torrid climate they must very often endure. It is likely enough, also, that they seldom make war upon

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or when a tiger felt himself severely wounded, and was roused to revenge by despair, his aim was to remain concealed, and to make off as quietly as possible. It was after he had broken cover, or when he found himself in a situation so as to be fairly at bay, that the serious part of the sport began, in which case he attacked his enemies boldly, and always died fighting. * * * * When a tiger springs on an elephant, the latter is generally able to shake him off under his feet, and then woe be to him! The elephant either kneels on him, and crushes him at once, or gives him a kick which breaks half his ribs, and sends him flying, perhaps 20 paces.'"—HEBER'S JOURNAL, *abridged*.

* IN WHAT NUMERICAL PROPORTION.—In the eastern countries, where the tiger abounds, they are not found in such numbers as natural procreation would lead us to conclude they were. "I am strongly inclined to think," says Captain Williamson, "that tigers are peculiarly subject to some acute distemper, which carries off great numbers; or that they have some very powerful enemy, with which we are unacquainted; else, if we admit that a tigress bears two cubs annually; nay, if we calculate that she rears but one in three years, during a period of twelve years, we should find the increase so prodigious, as to leave no chance against being over-run with them in every direction. In some districts, the rewards held forth by government and by individuals, have, without doubt, produced benefit: but such efforts must be confined to particular spots, and never could affect those immense jungles, stretching along the boundaries of Bengal for at least a thousand miles on each side, and extending in many places two or three hundred miles in breadth. These grand depots, to which neither man, horse, nor elephant can have access, and in which deer, &c. abound, supplying the superior beasts of prey with ample sustenance, could not fail, but for some powerful curb, to cause such an augmentation as must, in time, annihilate not only every animal a tiger could destroy, but ultimately the tigers themselves must perish of hunger."—ORIENTAL FIELD SPORTS

† BENGAL TIGER FOUND IN SIBERIA.—Ehrenberg, during his journey through Siberia, made a discovery of great interest for the geography of animals, and in some respects for the history of fossil bones, viz. the existence of the great tiger of Bengal in Northern Asia, between the latitudes of Paris and Berlin. He also describes a great panther, with long hair (Felis irbis), he met with in the Altain chain of mountains.—ARCANA OF SCIENCE, 1832.

(*g*) The remainder of this description is taken from Mr. Buffon, except where marked with commas each other, the rhinoceros being a peaceable animal, and the tiger knowing its strength too well to venture the engagement. It is still more likely that the tiger finds this a very convenient situation, since it can there surprise a greater number of animals, which are compelled thither from the same motives. In fact, it is generally known to lurk near such places where it has an opportunity of choosing its prey, or rather of multiplying its massacres. When it has killed one, it often goes to destroy others, swallowing their blood at large draughts, and seeming rather glutted than satiated with its abundance.*

However when it has killed a large animal, such as a horse or a buffalo, it immediately begins to devour it on the spot, fearing to be disturbed. In order to feast at its ease, it carries off its prey to the forest, dragging it along with such ease, that the swiftness of its motion seems scarce retarded by the enormous load it sustains. From this alone we may judge of its strength; but, to have a more just idea of this particular, let us stop a moment to consider the dimensions of this most formidable creature.† Some travellers have compared it for size to a horse, and others to a buffalo, while others have contented themselves with saying that it was much larger than a lion. We have recent accounts of this animal's magnitude that deserve the utmost confidence. Mr. Buffon has been assured by one of his friends, that he saw a tiger, in the East Indies, of fifteen feet long. "Supposing that he means including the tail, this animal, allowing four feet for that, must have been eleven feet from the tip of the nose to the insertion of the tail. Indeed, that which is now in the tower is not so large, being, as well as I could measure, six feet from the tip to the insertion, and the tail was three feet more. Like all the rest of its kind, its motions are irregular and desultory; it bounds rather than runs; and like them rather chooses to take its prey by surprise than to be at the trouble of hunting it down." How large a leap it can take at once we may easily judge, by comparing what it might do to what we see so small an animal as the cat actually perform. The cat can leap several

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* HABITS, LURKING.—A large proportion of the soil of India is of a reddish hue, and the grass during the summer heats being deprived of the sap proper to create a verdure, becomes of a dusky colour, very similar to the brighter parts of a tiger's coat. These circumstances are peculiarly favourable to the animal's concealment; so much so, that a tiger is often roused where there does not exist any cover adequate to sheltering half his bulk: the colour of the animal so perfectly corresponding with the surrounding objects, as to conceal the danger.—ORIENTAL FIELD SPORTS.

† STRENGTH OF THE TIGER.—A tiger will convey a man with as much ease, whom he has killed, as a cat will a rat. "I once witnessed an instance," says Captain Williamson, "which gave me a very complete idea of a tigers proceedings, and of his powers. I was travelling post in my palankeen, through the Ramghur district, which is mountainous and little cultivated, being for the most part in a state of nature and abounding in jungles, when a *bangy-wollak*, who conveyed two baskets of linen and refreshments, and who preceded the palankeen about a hundred and fifty yards, set down his load, and seated himself on the side of the road to rest awhile About two yards behind him was a small bush, not much larger than a good sized currant tree, round which a small quantity of jungle grass was growing. There was not another twig to be seen for at least half a mile, on that side of the road. No sooner had the poor fellow seated himself, than a tiger sprang from behind, or rather from within the bush, and after giving the fatal blow with his paw, seized the man by the shoulder and dragged him off, with the utmost ease, at a round pace, into a thick cover which had formerly skirted the road, but which had been cut away to the distance of about one hundred yards, for the safety of travellers."—ORIENTAL FIELD SPORTS.

TIGER'S PAW.—The tiger's fore paw is the invariable engine of destruction. Most persons imagine that if a tiger were deprived of his claws and teeth, he would be rendered harmless; but this is a gross error. The weight of the limb is the real cause of the mischief; for the talons are rarely extended when a tiger seizes. The operation is similar to that of a hammer; the tiger raising his paw, and bringing it down with such force, as not only to stun a common sized bullock, or buffalo, but often crushing the bones of the skull. I have seen many men and oxen killed by tigers, in most of which the mark of the claw could not be seen; and where scratches did appear, they were obviously the effect of chance, from the paw sliding downward.—ORIENTAL FIELD SPORTS.

THE BLACK OR SPOTTED TIGER.

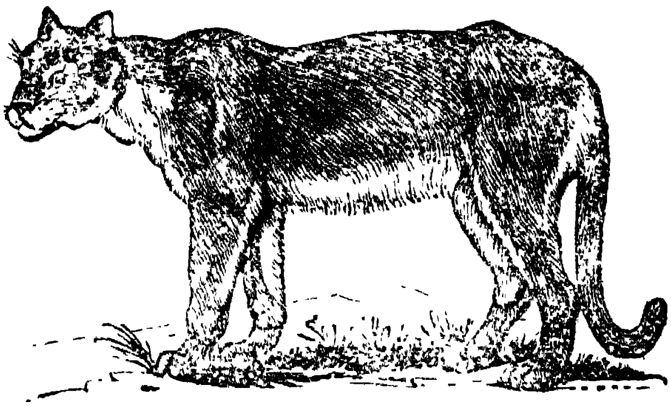
TIGERS AT LAIR

feet at a bound; and the tiger, who is ten times as long, can no doubt spring proportionably.

As to the number of its young, we have no certain accounts; however, it is said, that it brings forth four or five at a time. Although furious at all times, the female, upon this occasion, exceeds her usual rapacity; and, if her young are taken from her, she pursues the spoiler with incredible rage; he, to save a part, is contented to lose a part, and drops one of her cubs, with which she immediately returns to her den, and again pursues him; he then drops another, and by the time she has returned with that, he generally escapes with the remainder. If she loses her young entirely, she then becomes desperate, boldly approaches even the towns themselves, and commits incredible slaughter. The tiger expresses its resentment in the same manner with the lion; it moves the muscles and skin of its face, shows its teeth, and shrieks in the most frightful manner. Its note is very different from that of the lion; being rather a scream than a roar: and the ancients expressed it very well, when they said that, *tigrides indomitæ raucant rugiunt que leones.*

The skin of these animals is much esteemed all over the east, particularly in China; the mandarins cover their seats of justice in the public places with it, and convert it into coverings for cushions in winter. In Europe, these skins, though but seldom to be met with, are of no great value, those of the panther and the leopard being held in much greater estimation. This is all the little benefit we derive from this dreadful animal.*

There is an animal of America, which is usually called the red tiger, but Mr Buffon calls it the cougar, which, no doubt, is very different from the tiger of the east. Some, however, have thought proper to rank both together; and I will take leave to follow their example, merely because the cougar is more like a tiger in every thing, except the colour, than any other animal I know, having the head, the body, and the neck, shaped very much in the same manner. Of these slight differences, words


(Cougar.)

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* **Destroying Tigers.**—Besides by hunting, the most curious, and indeed safest way mentioned by Captain Williamson, except the poisoned arrow, is in use in some parts of the Nabob Vizier of Oude's dominions. "I never saw it practised," he says, "though it has repeatedly been described to me by the natives in that quarter, and particularly by a Mussulman gentleman who was for many years a public character at the Nabob's court. Though it is probable that many a smile will be excited by the recital, yet as I have a confidence in the fact, I hesitate not to present it to my readers.

"The tract of a tiger being ascertained, which though not invariably the same, may yet be known sufficiently for the purpose, the peasants collect a quantity of the leaves of the *prauss*, which are like those of the sycamore, and are common in most underwoods, as they form the large portion of most jungles in the north of India. These leaves are smeared with a species of bird lime, made by bruising the berries of an indigenous tree, by no means scarce, but of which I cannot at present call to mind the name; they are then strewd with the gluten uppermost, near to that opake spot to which it is understood the tiger usually resorts during the noontide heats. If by chance the animal should tread on one of those smeared leaves, his fate may be considered decided. He commences by shaking his paw with a view to remove the adhesive incumbrance; but finding no relief from that expedient, he rubs the nuisance against his face with the same intention, by which means his eyes, ears, &c become agglutinated, and occasions such uneasiness as causes him to roll, perhaps, among many more of the smeared leaves, til at length, he becomes completely enveloped, and is deprived of sight. In this would give but a very faint idea; it will be, therefore, sufficient to observe, that they are both equally slender, and are smaller where the neck joins the head, than others of the panther kind. There is one at present in the Tower; and it seemed to me, as well as I could see it through the bars, that were it properly streaked and coloured, it would in all things resemble a small tiger. It is, however, of a very different colour, being of a deep brown, and the tail very long and pointed. It is rather darker on the back; under the chin it is a little whitish, as also on the lower part of the belly.

Of all the American animals, this is the most formidable and mischievous; even their pretended lion not excepted. It is said, there are several sorts of them; and, as well as I can remember, I have seen one or two here in England, both differing from the present, in size and conformation.

The cougars are extremely common in South America, and, where the towns border upon the forest, these make frequent incursions by night into the midst of the streets, carrying off fowls, dogs, and other domestic creatures. They are, however, but weak and contemptible, compared to the great tiger, being found unable to cope with a single man. The Negroes and Indians are very dexterous in encountering them; and some, even for the sake of their skins, seek them in their retreats.

This animal, as we are assured, is often successful against the crocodile; and it is the only quadruped in that part of the world, that is not afraid of the engagement. It must be no unpleasant sight to observe, from a place of safety, this extraordinary combat, between animals so terrible and obnoxious to man. Such as have seen it, describe it in the following manner:—When the tiger, impelled by thirst, that seems continually to consume it, comes down to the river side to drink, the crocodile, which makes no distinction in its prey, lifts its head above water to seize it; the tiger, not less rapacious than the other, and unacquainted with the force of the enemy, boldly ventures to seize it, and plunges its claws into the eyes of the crocodile, which is the only vulnerable part of its body; upon this the crocodile instantly dives under water, and the tiger goes down with him, for it will sooner die than let go its hold. In this manner the combat continues for some time, until the tiger is drowned, or escapes, as is sometimes the case, from its disabled enemy.*

THE PANTHER AND THE LEOPARD.—We have hitherto found no great difficulty in distinguishing one animal from another, each carrying its own peculiar marks, which, in some measure, serve to separate it from all the rest. But it is otherwise, when we come to these of the cat kind, that fill up the chasm between the tiger and the cat. The spots with which their skins are diversified, are so various, and their size so equivocal, that it is no easy matter to distinguish the species, par-

(Leopard.)

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situation he may be compared to a man who has been tarred and feathered. The anxiety produced by this strange and novel predicament soon discovers itself in dreadful howlings, which serve to call the watchful peasants, who, in that state, find no difficulty in shooting the mottled object of detestation."—ORIENTAL FIELD SPORTS.

* THE COUGAR OR PUMA.—This animal, once called the American lion, occupies the second place among the cats of the new world. For his title, the latter at least, he

ticularly as we have little else but the spots and the size to guide us in making the distinction.

Of all this tribe, whose skins are so beautifully spotted, and whose natures are so mischievous, the panther may be considered as the foremost. This animal has been by many naturalists mistaken for the tiger; and, in fact, it approaches next to it in size, fierceness, and beauty. It is distinguished, however, by one obvious and leading character; that of being spotted, not streaked; for, in this particular, the tiger differs from the panther, the leopard, and almost all the inferior ranks of this mischievous family.

This animal, which Buffon calls simply the panther, Linnæus the pard, Gesner the pardalis, and the modern Latins the leopardus; this animal, I say, which goes by too many names, and which the English have indiscriminately called by the name of the panther or the leopard, may be considered as the largest of the kind, and is spotted in a manner somewhat different from those that are smaller. As those spots however, make the principal difference between it and the lesser animals, which it otherwise resembles in shape, size, disposition, and beauty, I will first show these slight distinctions, and mention the names each animal has received in consequence thereof; and then proceed to give their history together, still marking any peculiarity observable in one of the species, which is not found in the rest.

Next to the great panther, already mentioned, is the animal which Buffon calls the leopard, a name which he acknowledges to be given arbitrarily, for the sake of distinction. Other naturalists have not much attended to the slight differences between this and the great panther, nor have they considered its discriminations as sufficient to entitle it to another name. It has hitherto, therefore, gone under the name of the leopard, or panther of Senegal, where it is chiefly found. The differences between this animal and the former are these: the large panther is often found to be six feet long, from the tip of the nose to the insertion of the tail; the panther of Senegal is not above four. The large panther is marked with spots in the manner of a rose, that is, five or six make a kind of circle, and there is generally a large one in the middle. The leopard of Senegal has a much more beautiful coat, the yellow is more brilliant, and the spots are smaller, and not disposed in rings but in clusters. As to the rest, they are both whitish under the belly; the tail in both is pretty long, but rather longer in proportion in the latter, than the former. To these two animals, whose differences seem to be so very minute, we may add a third; namely, the jaguar or panther of America.* This, in every respect, resembles the two

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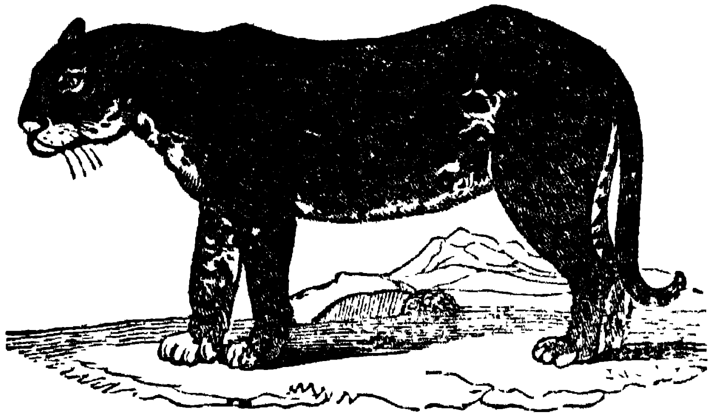
was in a great degree indebted to an absurd notion on the part of the early colonists, which was even shared by many naturalists, that he was in reality, neither more nor less than a degenerated variety of that far more noble animal. This opinion has given way to sounder views, and he is now universally recognised as forming a species clearly distinguishable from every other, by a combination of characters which it is impossible to mistake. In captivity, the puma readily becomes tame, and may even be rendered docile and obedient. His manners closely resemble those of the domestic cat; like it he is extremely fond of being noticed, raises his back and stretches his limbs beneath the hand that caresses him, and expresses his pleasure by the same quiet and complacent purring. They soon become attached to those with whom they are familiar; and numerous instances might be mentioned in which they have been suffered to roam almost at large about the house without any injurious results. The late Mr. Kean, the tragedian, possessed an animal of this species so tame as to follow him about almost like a dog, and to be frequently introduced into his drawing-room, when filled with company, at perfect liberty.—Ed.

* The Jaguar.—Buffon has mistaken the jaguar, which he describes from an ocelot, and refers to the former animal, because, probably, it was a larger species, to the panther of the ancients, transposing his figures accordingly. The furriers, and exhibitors of wild beasts have imbibed this error; and the jaguar of America has altogether usurped the name of panther, from the species of the old world, to which it was originally applied.

Animals of the Cat kind.—In this species, we have, in a remarkable manner, the opportunity of observing the mutual harmony existing between the mental impulses and the physical powers of animals; their disposition or inclination to destruction is precisely in unison and proportion with their former, except in the disposition of its spots, and that its neck and head are rather streaked than spotted. The jaguar is also said to be lower upon its legs, and less than the leopard of Senegal. These three quadrupeds, as we see, have but very slight differences, and the principal distinction used by Buffon, is taken from the size.


(Jaguar.)

We come next to an animal confessedly different from any of the former, being much smaller, and its colour more inclining to white. Its name, however, in our language, has caused no small confusion. It has been generally called by foreigners, the onza, or the ounce, and this name some of our own writers have thought proper to give

bodily powers. If very weak, they are excessively timid; if extremely strong, they are equally undaunted; while those which hold a medium station in this respect, seem generally to appreciate, as it were, with more sobriety, the conditions of their existence, and to submit themselves to the dominion and artificial education of man more easily than the rest. The hunting leopard is in this intermediate situation.

Hunting Leopard.—About as big as a large dog, the leading weapons of offence, the claws, are in the same situation as those of the animal which is more immediately its superior; incapable of being withdrawn into a sheath for protection, they are constantly exposed to the friction of the ground, by which they become worn and blunt, and so much the less effectual for active warfare; but otherwise the animal has all the suppleness and elasticity, the trenchant teeth, and the powerful jaws of the cats. Partially deficient, therefore, in the physical powers of its congeners, it is equally wanting in the extreme ferocity of its disposition. In a certain aptness or capability it possesses of being trained for field sports, it is also more like the dogs than the cats. It is, therefore, strictly speaking, intermediate; and we appear to pass naturally from the larger race to the smaller. It also exhibits the first step or remove from the perfect fitness for carnivorous and predatory habits, in the loss of the retractile power of the talons.

Of the habits of the hunting leopard in a state of nature, we have no certain information; but in his tamed and domesticated condition, he has been rendered in some countries a useful auxiliary to man. In the east he is employed in hunting by the nobles of the land.

It will be seen by the following brief account of the mode in which the chase with the hunting leopard is conducted, that it bears a close resemblance to the ancient sport of hawking, so prevalent throughout Europe in the days of feudal tyranny. The animal, or animals, for occasionally several of them are employed at the same time, are carried to the field in low chariots, on which they are kept chained and hooded, in order to deprive them of the power and temptation to anticipate the word of command, by leaping forth before the appointed time. When they are thus brought within view of a herd of antelopes, which generally consists of five or six females and a male, they are unchained, and their hoods are removed, their keepers directing their attention to the prey, which as they do not hunt by smell, it is necessary they should have constantly in sight. When this is done, the wily animal does not at once start forwards toward the object of his pursuit, but, seemingly aware that he would have no chance of overtaking an antelope in the fleetness of the race, in which the latter is beyond measure his superior, wends cautiously along the ground, concealing himself as much as possible from sight, and, when he has in this covert manner nearly reached the unsuspecting herd, breaks forth upon them unawares, and after five or six tremendous bounds, which he executes with almost incredible velocity, darts at once upon his terrified victim, strangles him in an instant, and takes his fill of blood. In the meanwhile the keeper quietly approaches the scene of slaughter, caresses the successful animal.

it; but others of them, and these the most celebrated, such as Willughby, have given this name to a different animal with a short tail, and known to the ancients and moderns by the name of the lynx. I confess myself at a loss, in this case, whom to follow; the alteration of names should be always made with great caution, and never but in cases of necessity.

The ounce, or the onca of Linnæus, is much less than the panther, being not, at most above three feet and a half long: however, its hair is much longer than that of the panther, and its tail still more so. The panther of four or five feet long, has a tail but of two feet, or two feet and a half. The ounce, which is but about three feet, has a tail often longer than the rest of its body. The colour of the ounce is also apparently different, being rather more inclining to a cream colour, which is deeper on the back, and whiter towards the belly. The hair on the back is an inch and a half long; that on the belly, two inches and a half; which is much longer than that of the panther. Its spots are disposed pretty much in the same manner as the large panther, except that on the haunches it is rather marked with stripes than with spots.

Descending to animals of this kind that are still smaller, we find the Catamountain, which is the ocelot of Buffon, or the tiger cat of most of those who exhibit it as a show. It is less than the ounce, but its robe more beautifully variegated. It is an American animal, and is about two feet and a half in length, from the nose to the insertion of the tail. It is extremely like a cat, except that it is larger and slenderer, that its colours are more beautiful, and its tail rather shorter. The fur is of a reddish colour, the whole beautified with black spots, and streaks of different figures. From this tribe of the cat kind with spotted skins and a long tail, we come to another, with skins diversified in like manner, but with a shorter tail. The principal of these is the lynx, the name by which the animal was known to Ælian, among the ancients; and to all our old English writers, among those of a more modern date. This animal is not above the size of the ounce, but is rather stronger built, and it has but twenty-eight teeth; whereas all the rest of the cat kind already mentioned have thirty.

Another animal of this kind is called the syagush, or, as Buffon names it, the caracal. It is a native of the East Indies, and resembles the lynx in size, in form, and even in the singularity of being tufted at the tips of the ears. However, the syagush differs in not being mottled as the lynx is; its fur, or rather hair, is rougher and shorter; its tail is rather longer, its muzzle more lengthened, its physiognomy more fierce, and its nature more savage.

The third and last animal that need be mentioned of this kind, is that which Buffon calls the serval, and which he has first described. It is a native of Malabar, resembling the panther in its spots, but the lynx in the shortness of its tail, in its size, and in its strong built form.

These seem to be all the principal distinctions among animals of the panther kind, from the largest of this tribe down to the domestic cat, which is the smallest of all these fierce and mischievous varieties. In all, their nature seems pretty much the same; being equally fierce, subtle, cruel, and cowardly. The panther, including the leopard and the jaguar, or American panther, as they are the largest, so also are they the most dangerous of this kind; for the whole race of cats are noxious in proportion to their power to do mischief. They inhabit the most torrid latitudes of India, Africa, and America, and have never been able to multiply beyond the torrid zone. They are generally found in the thickest and the most entangled forests, and often near remote habitations, where they watch to surprise all kinds of domestic animals. They very seldom attack man, even though provoked by him; they seem rather desirous of finding

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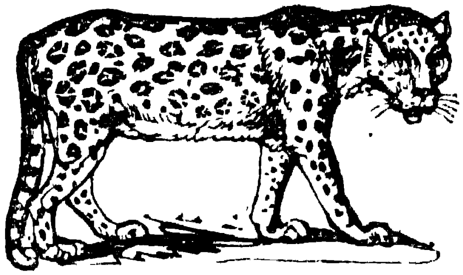
and throws to him pieces of meat to amuse him and keep him quiet while he blinds him with the hood, and replaces him upon the chariot, and chains him. But if, as is not unfrequently the case, the herd should have taken alarm, and the animal should prove unsuccessful in his attack, he never attempts to pursue them, but returns to his master with a mortified air, to be again let slip at a fresh quarry whenever a fit opportunity occurs.

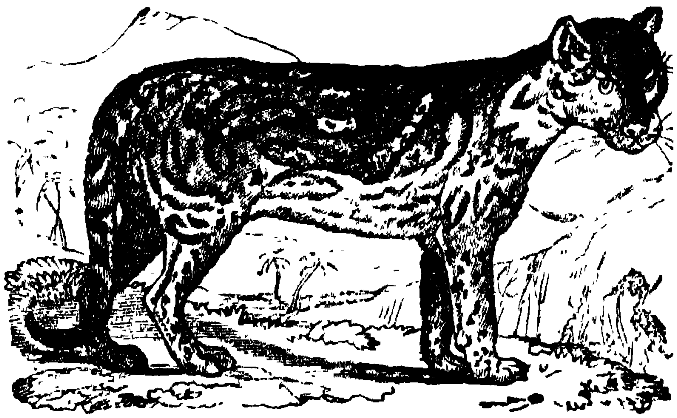
safety by flight, or by climbing trees, at which they are very expert. In this manner also they often pursue their prey; and, being expert at seizing it, as well above as below, they cause a vast destruction. Of all other animals, these are the most sullen, and, even to a proverb, untameable. They still preserve their fierce and treacherous spirit; and at those places where they are exposed to be seen among others, we often observe, that while their keeper is familiar with the lion or the bear, yet he is apprehensive of the large panther, and keeps it bound with the shortest chain.

As the ounce differs from these in figure and size, so also it seems to differ in disposition, being more mild, tractable, and tame. These we frequently see as harmless and innocent as cats; and there is one at present in the Tower, with which the keeper plays without the smallest apprehension. The ounce, therefore, is remarkable for being easily tamed; and, in fact, it is employed all over the east for the purposes of hunting.

The ounce, however, is not so dangerous; and is treated with more confidence and familiarity. It is usually brought to the field hoodwinked behind one of the horsemen. When the game appears, the ounce is instantly uncovered, and shown where it lies; upon which the fierce creature darts like an arrow to the place, and seizes it at once, or, missing it, remains motionless in the place. It would be vain to attempt retrieving its disgrace by continuing the pursuit; for, although it bounds with greater agility than most other animals, yet it is slow and awkward in running, and has no means of finding the animal it pursues by the smell, as is common among those of the dog kind.

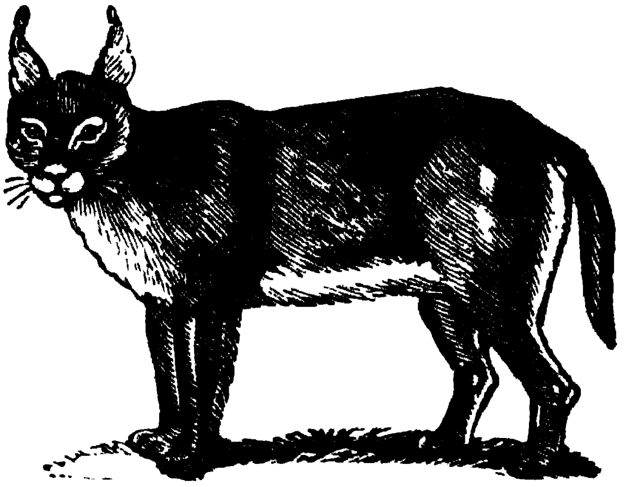

(Ounce.)

The catamountain, or ocelot, is one of the fiercest, and for its size, one of the most destructive animals in the world. It is, as was before observed, a native of South America, and by no means capable of the same education as the ounce, which it more approaches in size than in disposition. Two of these, from whom Buffon has taken his description, were brought over from Carthagena, and having been taken from the dam when very young, were afterwards suckled by a bitch. But, before they were three months old, they had strength and ingratitude sufficient to kill and devour their nurse. Their succeeding fierceness and malignity seemed to correspond with their first efforts; for no arts could tame or soften their natures; and while they continued in their cages, they still testified an unceasing disposition for slaughter. When their food was given them, the male always served himself before the female ventured to touch a bit; and it was not till he was satisfied that the other began. In their savage state, these animals are still more destructive; having great strength and agility, they very easily find and overtake their prey, which they pursue among the tops of the trees, as well as on the ground; but what renders them still more mischievous, is their unceasing appetite rather for the blood than the flesh of their prey. They suck this with the greatest avidity, but frequently leave the carcass otherwise untouched, in order to pursue other animals


(Catamountain, or Ocelot)

for their blood in like manner. They generally continue on the tops of trees, like our wild cats; where they make their nest, and often bring forth their young. When they spy any animal they can master, and there are but few in the forest but what are inferior, they dart down upon it with inevitable exactness.

The whole tribe of animals of the panther kind, with long tails, are chiefly inhabitants, as was said, of the torrid zone; but those of the short-tailed kind, and particularly the lynx, is principally found in the cold countries that are bordering on the pole. The lynx is chiefly to be met with in the north of Germany, Lithuania, Muscovy, Siberia, and North America.* Those of the new continent, however, are rather smaller than in Europe, as is the case with almost all their quadrupeds; they are somewhat whiter also, but in other respects there is scarce any difference to be found among them.(*g*) This animal has been called by some *Lupus cervarius*, or a creature compounded between a wolf and a stag; but for what reason is hard to guess; it no way resembles either, in shape or in disposition. In its nature, it exactly resembles the cat, except that, being bigger and nearly two feet long, it is bolder and fiercer. Like the cat, it climbs trees, and seeks its prey by surprise; like the cat, it is delicate and cleanly, covering its urine with its paws; and it resembles the wolf in nothing except its cry, which often deceives the hunters, and induces them to think they hear a wolf and not a lynx. This animal also, is rather more delicate than the cat; and, after having once feasted upon its prey, will never return to it again, but hunts the woods for another. From hence may have arisen the common report of the lynx having, of all other quadrupeds, the shortest memory.


(Lynx.)

The syagush and the serval are both so like all the rest of the cat kind in disposition, that it is but repeating the same account once more to give their distinct history. As the lynx is found only in cold countries, so the syagush is to be met with only in the warm tropical climates. It is used, in the same manner as the ounce, for hunting; but it seems to have a property which the other has not; namely, that of being able to overtake its prey by pursuing it.

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* The Canada Lynx.—This is the only species of the genus which exists north of the Great Lakes, and eastward of the Rocky Mountains. It is rare on the sea coast, and does not frequent the barren grounds, but it is not uncommon in the woody districts of the interior, since from seven to nine thousand are annually procured by the Hudson's Bay Company. It is found on the Mackenzie River, as far north as latitude 66°. It is a timid creature, incapable of attacking any of the larger quadrupeds, but well armed for the capture of the American hare, on which it chiefly preys. Its large paws, slender loins, and long, but thick hind legs, with large buttocks, scarcely relieved by a short, thick tail, give it an awkward, clumsy appearance. It makes a poor fight when it is surprised by a hunter in a tree; for though it spits like a cat, and sets its hair up, it is easily destroyed by a blow on the back with a slender stick; and it never attacks a man. Its gait is by bounds, straightforward, with the back a little arched, and lighting on all the feet at once. It swims well, and will cross the arm of a lake two miles wide; but it is not swift on land. The early French writers on Canada, who ascribed to it the habit of dropping from trees on the backs of deer, and destroying them by tearing their throats and drinking their blood, gave it the name of *Loup cervier*.—Richardson's North American Zoology.

(g) Buffon.

We had one of these animals a few years ago sent over from the East Indies but it was not able to endure the change of climate, and it died in a very short time after it was brought to the Tower. Whether consumed by disease or not, I cannot tell, but it seemed to me much slenderer than the cat or the lynx, and its ears were much longer; however, it is a very strong creature for its size, and has been known to kill a large dog in single combat:(*g*) nevertheless, it is, like all of the cat kind except the lion, remarkable for its cowardice, and will never, except in cases of necessity, attack an animal that is its equal in strength or activity. For this reason, when brought into the field, and put upon a service of danger, it obstinately refuses, and is alert only in the pursuit of animals that are too feeble for resistance, or too timid to exert their strength.

(Syagush, or Caracal.)

From what has been said of this rapacious tribe, we perceive a similitude in the manners and dispositions of them all, from the lion to the cat. The similitude of their internal conformation, is still more exact; the shortness of their intestines, the number of their teeth, and the structure of their paws. The first of this class is the lion, distinguishable from all the rest by his strength, his magnitude, and his mane. The second is the tiger, rather longer than the lion, but not so tall, and known by the streaks and the vivid beauty of its robe; including also the American tiger or cougar, distinguishable by its size, next to that of the tiger, its tawny colour, and its spots. The third is the panther and the leopard. The fourth is the ounce, not so large as any of the former, spotted like them, but distinguishable by the cream coloured ground of its hair, and the great length of its tail, being above the length of its body. The fifth is the catamountain or tiger cat, less than the ounce, but differing particularly in having a shorter tail, and being streaked down the back like a tiger. The sixth is the short-tailed kind, namely, the lynx, of the size of the former, but with a short tail, streaked, and the tips of its ears tufted with black. The seventh is the syagush, differing from the lynx in not being mottled like it, in not being so large, and in having the ears longer, though tipped with black, as before. The eighth is the serval, resembling the lynx in its form, and the shortness of its tail; streaked also like it, but not having the tips of its ears tufted. Lastly, the cat, wild and tame, with all its varieties; all less than any of the former, but like them, equally insidious, rapacious, and cruel.*

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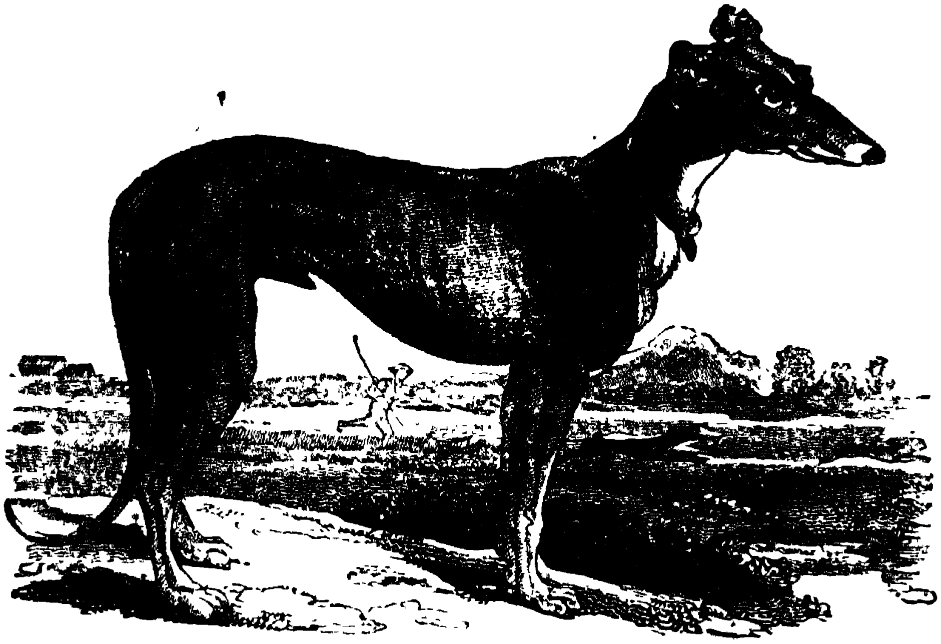
* REPRODUCTION.—The course of reproduction of the large felinæ has, of late years, been perfectly open to observation in the menageries, and one cannot but feel some surprise that the breeding these animals in a state of confinement should be comparatively matter of modern experiment only. We have now not only instances of these animals breeding in the ordinary manner, but varieties have been reproduced, so distant, as to be inserted in zoological catalogues, as specifically different. We may advert to the reproduction between the African lion and Asiatic tigress, in Atkins's menagerie. Between these species, three cubs were littered at Windsor in 1824. They are named lion-tigers.

(*g*) Buffon.



(Greyhound.)

CHAP. XII

ANIMALS OF THE DOG KIND.

THE second class of carnivorous quadrupeds may be denominated those of the dog kind.* This class is neither so numerous nor so powerful as the former, and yet neither so treacherous, rapacious, nor cowardly. This class may be principally distinguished by their claws, which have no sheath, like those of the cat kind, but still continue at the point of each toe, without a capability of being stretched forward or drawn back. The nose also, as well as the jaw, of all the dog kind, is longer than in the cat; the body is, in proportion, more strongly made, and covered with hair instead of fur. There are many internal distinctions also; as in the intestines, which are much longer in the dog kind than in those of the cat; the eye is not formed for night vision; and the olfactory nerves are diffused, in the dog kinds, upon a very extensive membrane within the skull.

If we compare the natural habitudes of this class with the former, we shall find that the dog kinds are not so solitary as those of the cat, but love to hunt in company, and encourage each other with their mutual cries. In this manner the dog and the jackal pursue their prey; and the wolf and fox, which are of this kind, though more solitary and silent among us, yet, in countries where less persecuted, and where they can more fearlessly display their natural inclinations, they are found to keep together in packs, and pursue their game with alternate howlings.

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* THE DOG SPECIES.—The very extensive varieties of the dog, which have been produced by domestication and other causes, have led naturalists into great differences of opinion as to the original stock from which these varieties have sprung. Wild dogs, as they are at present found, are, in most cases, dogs without masters; living in a miserable condition, away from human society, and easily won back to its subjection and comforts; these therefore, do not advance our inquiries, as to the original type of the species in a state of nature. Some think the dog is a jackal, some a wolf. In the character of erect ears, many of our domestic dogs nearly resemble the half-reclaimed species, such as the Esquimaux, (see a subsequent *note*); and again, others, in the shape of the head, approach more nearly to the Australasian dog, which has been lately considered as retaining most of the probable distinctive characters of the wild and original stock.

Animals of the dog kind want some of the advantages of the cat kind, and yet are possessed of others in which the latter are deficient. Upon observing their claws, it will easily be perceived that they cannot, like cats, pursue their prey up the sides of a tree, and continue the chase among the branches; their unmanageable claws cannot stick in the bark, and thus support the body up along the trunk, as we see the cat very easily performs: whenever, therefore, their prey flies up the tree from them, they can only follow it with their eyes, or watch its motions till hunger again brings it to the ground. For this reason, the proper prey of the dog kind are only those animals that, like themselves, are unfitted for climbing; the hare, the rabbit, the gazelle, or the roe-buck.

As they are, in this respect, inferior to the cat, so they exceed it in the sense of smelling; by which alone they pursue their prey with certainty of success, wind it through all its mazes, and tire it down by perseverance. It often happens, however, in the savage state, that their prey is either too much diminished, or too wary to serve for a sufficient supply. In this case, when driven to an extremity, all the dog kinds can live for some time upon fruits and vegetables, which, if they do not please the appetite, at least serve to appease their hunger.

Of all this tribe, the dog has every reason to claim the preference, being the most intelligent of all known quadrupeds, and the acknowledged friend of mankind. The dog, (*g*) independent of the beauty of his form, his vivacity, force, and swiftness, is possessed of all those internal qualifications that can conciliate the affections of man, and make the tyrant a protector. A natural share of courage, an angry and ferocious disposition, renders the dog, in its savage state, a formidable enemy to all other animals: but these readily give way to very different qualities in the domestic dog, whose only ambition seems the desire to please; he is seen to come crouching along, to lay his force, his courage, and all his useful talents, at the feet of his master; he waits his orders, to which he pays implicit obedience; he consults his looks, and a single glance is sufficient to put him in motion; he is more faithful even than the most boasted among men; he is constant in his affections, friendly without interest, and grateful for the slightest favours; much more mindful of benefits received than injuries offered; he is not driven off by unkindness; he still continues humble, submissive, and imploring; his only hope to be serviceable, his only terror to displease; he licks the hand that has been just lifted to strike him, and at last disarms resentment by submissive perseverance.*

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* FACULTIES OF BRUTES.—The dog is the only animal that dreams; he and the elephant the only animals that understand looks; the elephant is the only animal that, besides man, feels *ennui;* the dog, the only quadruped that has been brought to speak. Leibnitz bears witness to a hound in Saxony, that could speak distinctly thirty words.—ARCANA OF SCIENCE, 1829.

THE POODLES FROM MILAN.—Mrs. Lee, in a letter to Loudon's Magazine, thus writes of these sagacious animals:—"Sir,—Two very remarkable savans now divide the attention of the French public with the romantic tragedy of Hernani by Victor Hugo. They are Poodles from Milan, where they have received their education; the elder, named Fido, is white, with some black patches on the head and back, and the younger, who is called Bianco, is also white, but with red spots. Fido is a grave and serious personage, walks with dignity round the circle assembled to see him, and appears much absorbed in reflection. Bianco is young and giddy, but full of talent when he chooses to apply it. Owing to his more sedate disposition, Fido, however, is called upon to act the principal part of the exhibition: a word is dictated to him from the Greek, Latin, Italian, German, French, or English language, and selected from a vocabulary where fifty words in each tongue are inscribed, and which altogether make three hundred different combinations. An alphabet is placed before Fido, and from it he takes the letters which compose the given word, and lays them in their proper order at the feet of his master. On one occasion he was told to spell the word Heaven, and he quickly placed the letters till he came to the second *e*, he stood for an instant as if puzzled, but in a moment after he took the *e* out of the first syllable, and put it into the second. His attainments in orthography, however, are not so surprising as those in arithmetic; he prac-

(*g*) The rest of this description of the dog is tak[illegible] from Buffon; what I have added, is marked as before.

More docile than man, more obedient than any other animal, he is not only instructed in a short time, but he also conforms to the dispositions and the manners of those who command him. He takes his tone from the house he inhabits; like the rest of the domestics, he is disdainful among the great, and churlish among clowns. Always assiduous in serving his master, and only a friend to his friends, he is indifferent to all the rest, and declares himself openly against such as seem to be dependent like himself. He knows a beggar by his clothes, by his voice, or his gestures, and forbids his approach. When at night the guard of the house is committed to his care, he seems proud of the charge; he continues a watchful sentinel, he goes his rounds, scents strangers at a distance, and gives them warning of his being upon duty. If they attempt to break in upon his territories, he becomes more fierce, flies at them, threatens, fights, and either conquers alone, or alarms those who have most interest in coming to his assistance; however, when he has conquered, he quietly reposes upon the spoil,

tises the four rules with extraordinary facility, arranges the double ciphers as he did the double vowels in the word heaven, and rarely makes an error. When such does occur, his more thoughtless companion is called in to rectify it, which he invariably does with the greatest quickness; but as he had rather play than work, and pulls Fido by the ears to make him as idle as himself, he is quickly dismissed. One day the steady Fido spelt the word Jupiter with a *b*, instead of a *p*, after the manner of the Germans; Bianco was summoned to his aid, who, after contemplating the word, pushed out the *b* with his nose, and seizing a *p* between his teeth, put it into the vacancy. Fido is remarkable for the modest firmness with which he insists upon his correctness when he feels convinced of it himself; for a lady having struck a repeating watch in his ear, he selected an 8 for the hour, and a 6 for the three quarters. The company present, and his master, called out to him he was wrong; he reviewed his numbers, and stood still, his master insisted, and he again examined his ciphers, after which he went quietly, but not in the least abashed, into the middle of the carpet, and looked at his audience; the watch was then sounded again, and it was found to have struck two at every quarter, and Fido received the plaudits which followed with as gentle a demeanour as he had borne the accusation of error.

"One occupation seems to bring the giddy Bianco to the gravity of the elder savan, and when the spectators are tired of arithmetic and orthography, the two dogs either sit down with each other to écarté, or become the antagonists of one of the company. They ask for, or refuse cards, as their hands require, with a most important look; they cut at the proper times, and never mistake one suit for another. They have recourse to their ciphers to mark their points; and on one occasion Bianco having won, he selected his number, and on being asked what were the gains of his adversary, he immediately took an 0 between his teeth, and showed it to the guest; and both seem to know all the turns of the game as thoroughly as the most experienced card-players.

"All this passes without the slightest visible or audible sign between the poodles and their master; the spectators are placed within three steps of the carpet on which the performance goes forward; people have gone for the sole purpose of watching the master; every body visits them, and yet no one has found out the mode of communication established between them and their owner. Whatever this communication may be, it does not deduct from the wonderful intelligence of these animals; for there must be a multiplicity of signs not only to be understood with eyes or ears, but to be separated from each other in their minds, or to be combined one with another, for the various trials in which they are exercised.

"I have seen learned pigs and ponies, and can, after these spectacles, readily imagine how the extraordinary sagacity of a dog may be brought to a knowledge of the orthography of three hundred words; but I must confess myself puzzled by the acquirements of these poodles in arithmetic, which must depend upon the will of the spectator who proposes the numbers; but that which is most surprising of all is the skill with which they play écarté. The gravity and attention with which they carry on their game is almost ludicrous, and the satisfaction of Bianco when he marks his points is perfectly evident.

"I must not omit a very amiable feature in the character of these four-footed savans, which is, that their great superiority of instruction over their brethren has not in the least destroyed their more engaging qualities. Not only are they obedient, but lively, affectionate and gentle, and have not one particle of conceit, though all Paris sees and admires them.

"I can vouch for the entire veracity of the above statement, and am, Sir, yours, &c.—*Sarah Lee*, 27, *Burton Street*, *Burton Crescent*, *March*, 1830." (Late Miss Bowditch.)

and abstains from what he has detered others from abusing; giving thus at once a lesson of courage, temperance, and fidelity.*

The desire of hunting is natural to the dog, for all animals that live upon flesh hunt by nature; the lion and the tiger, whose force is so great that they are sure to conquer, hunt alone, and without art; the wolf, the fox, and the wild dog, hunt in packs, assist each other, and partake the spoil. But when education has perfected this talent in the domestic dog, when he has been taught by man to repress his ardour, to measure his motions, and not to exhaust his force by too sudden an exertion of it, he then hunts with method, and always with success.

Although the wild dog, such as he was before he came under the protection of mankind, is at present utterly unknown, no such animal being now to be found in any part of the world, yet there are many that, from a domestic state, have turned savage, and entirely pursue the dictates of nature.† In those deserted and uncultivated countries where the dog is found wild, they seem entirely to partake of the disposition of the wolf; they unite in large bodies, and attack the most formidable animals of the forest, the cougar, the panther, and the bison. In America, where they were originally brought by the Europeans, and abandoned by their masters, they have multiplied to such a degree, that they spread in packs over the whole country, attack all other animals, and even man himself does not pass without insult. They are there treated in the same manner as all other carnivorous animals, and killed wherever they happen to come: however, they are easily tamed: when taken home, and treated with kindness and lenity, they quickly become submissive and familiar, and continue faithfully attached to their masters.‡

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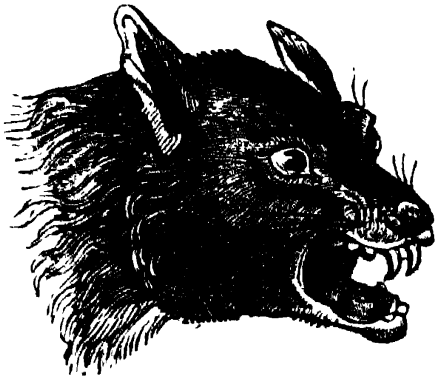
* SAGACITY.—The most amusing fact of this kind that I know of is one that was related to me by a gentleman on whose veracity I can place the most implicit reliance; and though it may appear to border on the marvellous, I think it too entertaining to withhold it. He informed me, that a friend of his, who had occasion, when in Paris, to pass one of the bridges across the Seine, had his boots, which had been previously well polished, dirted by a poodle dog rubbing against them. He in consequence went to a man who was stationed on the bridge, and had them cleaned. The same circumstance having occured more than once, his curiosity was excited, and he watched the dog. He saw him roll himself in the mud of the river, and then watch for a person with well-polished boots, against which he contrived to rub himself. Finding that the shoe-black was the owner of the dog, he taxed him with the artifice; and after a little hesitation, he confessed that he had taught the dog the trick in order to procure customers. The gentleman being struck with the dog's sagacity, purchased him at a high price, and brought him to England. He kept him tied up in London some time, and then released him. The dog remained with him a day or two, and then made his escape. A fortnight afterwards he was found with his former master, pursuing his old trade on the bridge in Paris.—JESSE'S GLEANINGS.

† THE DOG SOMETIMES RETROGRADES INTO A SAVAGE STATE.—In December, 1784, a dog was left by a smuggling vessel near Bromer, on the coast of Northumberland. Finding himself deserted, he began to worry sheep, and did so much mischief, that he created very considerable alarm in the county for a circuit of more than twenty miles. It is asserted, that when he caught a sheep, he bit a hole in its right side, and after eating the fat about the kidneys, left it. Several of them thus mangled were found alive by the shepherds; and, by proper attention, some of them not only recovered, but afterwards had lambs. From the delicacy of his feeding, the destruction may in some measure be conceived, as the fat of one sheep in a day would scarcely satisfy his hunger. Various were the means used to destroy him: frequently was he pursued with hounds, greyhounds, &c., but when the dogs came up with him, he lay down on his back, as if supplicating for mercy, and in that position they never hurt him. He was one day pursued from Howick to a distance of more than thirty miles, but returned thither and killed a sheep the same evening. His general residence was upon the Hind Hill, near Howick, where he had a view of four roads, and there, in 1785, he was at last shot.—ANNALS OF SPORTING.

‡ THE DHOLE, OR WILD DOG OF INDIA.—Some have confounded the *dhole*, or wild dog, with the jackal. This very singular animal is, I believe, only to be found along the borders of the western frontier of Bengal; and even where they are so scarce as not to be generally

In the same manner, as the dog is of the most complying disposition, so also is it the most susceptible of change in its form; the varieties of this animal being too many for even the most careful describer to mention. The climate, the food, and the education, all make strong impressions upon the animal, and produce alterations in its shape, its colour, its hair, its size, and in every thing but its nature. The same dog, taken from one climate, and brought to another, seems to become another animal; but different breeds are as much separated, to all appearance, as any two animals the most distinct in nature.* Nothing appears to continue constant with them but their internal conformation; different in the figure of the body, in the length of the nose, in the shape of the head, in the length and the direction of the ears and tail, in the colour, the quality and the quantity of the hair; in short, different in every thing but that make of the parts which serve to continue the species, and keep the animal



(Head of the Dhole, or Wild Dog of India.)

known. They are by nature extremely shy and avoid all places which are much frequented either by men or cattle. Residing for the most part in those immense saul-jungles, which, for hundreds of miles, appear like one black, dreary wilderness, it cannot be supposed that Europeans in general, who mostly confine their occupations and their ordinary recreations to the open country, could have many opportunities of seeing them. I should, perhaps, after more than twenty years' residence in Bengal, in which time I have traversed the country in almost every direction, have quitted India, and been inclined to dispute the existence of the *dhole*, had I not been stationed two years in Ramghur, in the heart of the western frontier, and had ocular demonstration of its identity. The *dhole*, commonly so called, though its name varies much in different places, appears to be about the size of a small greyhound. It has an uncommonly keen look; the countenance being highly enlivened by a remarkably brilliant eye. The body, which is slender and deep-chested, is very thinly covered with a reddish brown coat of hair, or, more properly, of a rich bay colour. The tail is long and thin, becoming, like the feet, ears, muzzle, &c., darker towards the extremities. Their limbs, though light and compact, appear to be remarkably strong, and to be equally calculated for speed or for power.

The *dholes* are said to be perfectly innocent if unmolested; but if attacked, extremely fierce and implacable. They do not willingly approach persons; but, if they chance to meet any in their course, they do not show any particular anxiety to avoid their sight; they view the human race rather as objects of curiosity: appearing not to be actuated either by apprehension or enmity. The peasants state that the *dholes* are keen in proportion to the size or powers of the animal they hunt; prefering elks to other deer, and particularly seeking the royal tiger. I have before suggested the probability that some particular enemy exists, which thins the tiger species; or else, from the ordinary course of propagation, their numbers would, inevitably, extend to the destruction of every other animal. Indeed, I feel some inclination to attribute such a check, on their multiplication, to the *dhole*; which, though incapable individually, or perhaps in small numbers, to effect the destruction of a royal tiger, may, from their custom of hunting together, with great ease overcome any beast to be found in the wilds of India; not, perhaps, excepting the rhinoceros; which, however, is not to be found in any numbers on the south side of the Ganges, where alone the *dholes* are as yet known to exist.—ORIENTAL FIELD SPORTS.

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* DEGENERATION OF DOGS, *in warm climates.* — Many affect to treat the idea of degenerations in quadrupeds with ridicule; but all who have been resident any time in India, must be completely satisfied that dogs of European breed become after every successive generation, more and more similar to the pariah or indigenous dog of that country. Hounds are the most rapid in their decline; and except in the shape of their ears, are very like many of the village curs, both in colour and form. Greyhounds and pointers decline also greatly, but with occasional exceptions. Spaniels and terriers preserve their race with less deviation than the other breeds. Mastiffs have been taken to India, but the climate is too severe for them. — ORIENTAL FIELD SPORTS.

distinct from all others. It is this peculiar conformation, this power of producing an animal that can reproduce, that marks the kind, and approximates forms that at first sight seems never made for conjunction.

From this single consideration, therefore, we may at once pronounce all dogs to be of one kind; but which of them is the original of all the rest, which of them is the savage dog from whence such a variety of descendants have come down, is no easy matter to determine. We may easily, indeed, observe, that all those animals which are under the influence of man, are subject to great variations. Such as have been sufficiently independent, so as to choose their own climate, their own nourishment, and to pursue their own habitudes, preserve the original marks of nature, without much deviation; and it is probable, that the first of these is even at this day very well represented in their descendants. But such as man has subdued, transported from one climate to another, controlled in their manner of living, and their food, have most probably been changed also in their forms: particularly the dog has felt these alterations more strongly than any other of the domestic kinds; for living more like man, he may be thus said to live more irregularly also, and consequently, must have felt all those changes that such variety would naturally produce. Some other causes also may be assigned for this variety in the species of the dog: as he is perpetually under the eye of his master, when accident has produced any singularity in its productions, man uses all his art to continue this peculiarity unchanged; either by breeding from such as had those singularities, or by destroying such as happened to want them; besides, as the dog produces much more frequently than some other animals, and lives a shorter time, so the chance for its varieties will be offered in greater proportion.

But which is the original animal, and which the artificial or accidental variety, is a question which, as was said, is not easily resolved. If the internal structure of dogs of different sorts be compared with each other, it will be found, except in point of size, that in this respect they are exactly the same. This, therefore, affords no criterion. If we look among the number of varieties to be found in the dog, we shall not find one so like the wolf or the fox, as that which is called the shepherd's dog. This is that dog with long, coarse hair on all parts except the nose, pricked ears, and a long nose, which is common enough among us, and receives his name from being principally used in guarding and attending on sheep. This seems to be the primitive animal of his kind; and we shall be the more confirmed in this opinion, if we attend to the different characters which climate produces in this animal, and the different races of dogs which are propagated in every country.*

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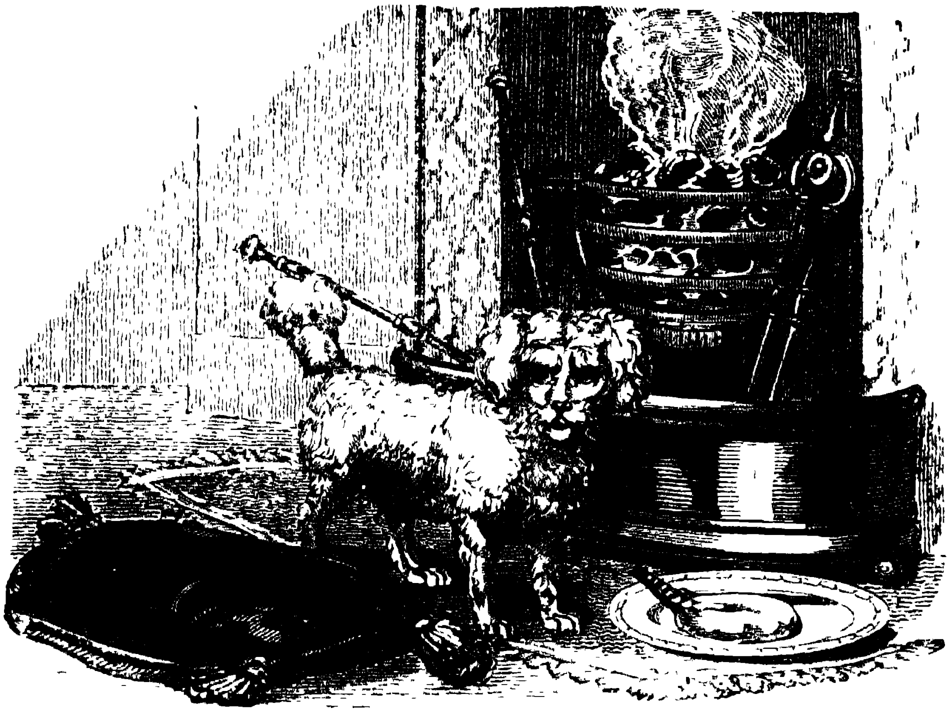
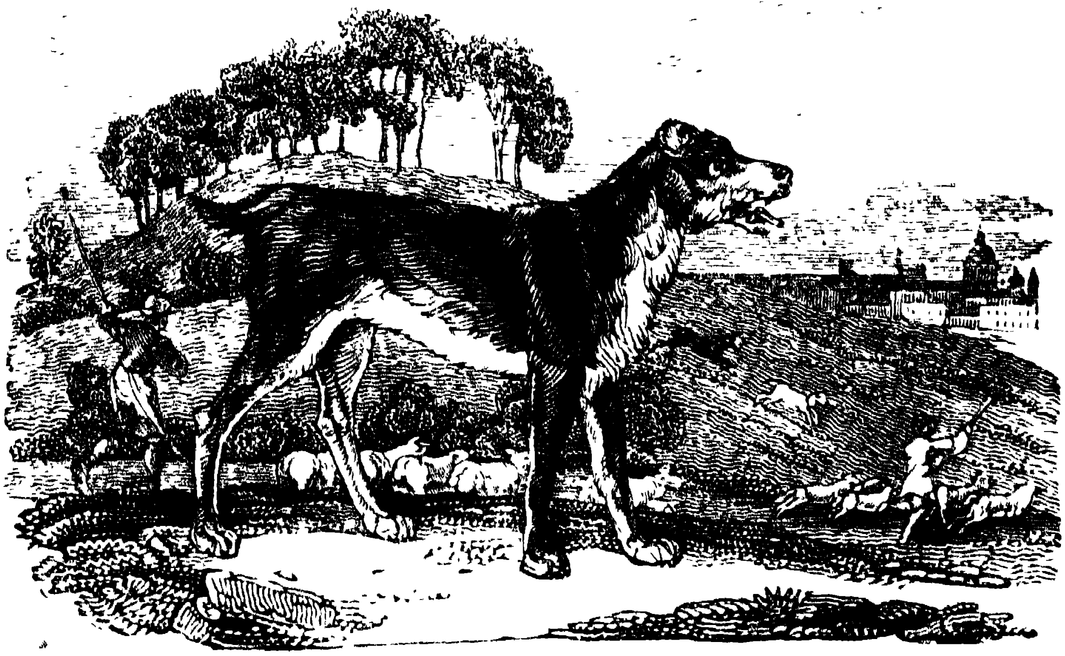
* THE SHEPHERD'S DOG.—This useful and intelligent animal is one of the most placid, obedient, serene, and grateful members of the canine race. He is ever alive to the slightest indication of his master's wishes, prompt and gratified to execute them, and he seems to enjoy the greatest delight when employed in any kind of useful service. Formed by nature with an instinctive propensity to industry, he is never more pleased than in exerting his talents for the benefit of man, and in giving constant proofs of his inviolable attachment.

The native calmness, patience, and devoted faithfulness of the shepherd's dog, render him insensible to all attractions beyond the arduous duties connected with the flock under his care. When once properly trained, he not only becomes perfectly acquainted with the extent of his beat, but also with every individual in his flock; he will most correctly select his own, and drive off such as encroach on his limits. This appears the more extraordinary, when we consider the vast extent of mountain country and the numerous flocks committed to the charge of a single shepherd, a duty which he could not possibly perform, but for the invaluable services of this sagacious animal. A word or signal from him will direct the dog, so as to conduct the flock to any point required, and that signal he will obey with energy, and unerring certainty. The labour of a shepherd, with the assistance of a dog, is comparatively an easy task; but without one, we can hardly suppose an occupation more arduous. Indeed, without the aid of this animal, it would be next to impossible to collect flocks in those extensive and precipitous tracts of mountain-land where the sheep delight to graze, and which in many places are quite inaccessible to man.



FRENCH POODLE



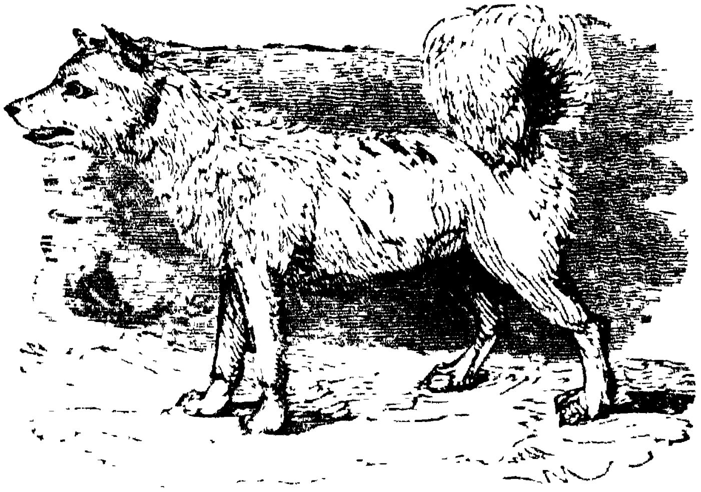
SHEPHERD'S DOG.

Page 141.

He makes the stem of that genealogical tree which has been branched out into every part of the world. This animal still continues pretty nearly in its original

The shepherd's dog, from being inured to all weathers, is naturally hardy; and, accustomed to fatigue and hunger, he is the least voracious of the species, and can subsist upon a scanty allowance. If a shepherd is travelling with his flock to a distance, his dog will only repose close to his feet; and should he wish to leave them for the purpose of refreshment, he has only to intimate his intention to his dog, and in his absence, he will guard the sheep with as much care, and keep them within due bounds, as well as he himself could have done. Although left alone for hours, a well trained dog always keeps the flock within the limits of a made road, even, although there are no fences.

The breed of this dog is preserved with the greatest attention to purity in the north of England, and in the Highlands of Scotland, where his services are invaluable. The shepherd's dog of this country, with all his good qualities, is still greatly inferior in point of size and strength to those of the Alps, and of that extensive range of mountains which divide France from Spain, as well as the variety which is found in the neighbourhood of Caucasus. In this country there are two kinds of this dog;—that used by the shepherds, which is of a small size, and the breed used by drovers and butchers. — CAPTAIN BROWN.



(Esquimaux Dog)

ESQUIMAUX DOG.—Captain Lyon who had many opportunities of studying the habits of this noble animal, thus interestingly writes about it.

"Having myself possessed, during our second winter, a team of eleven very fine animals, I was enabled to become better acquainted with their good qualities than could possibly have been the case by the casual visits of the Esquimaux to the ships. The form of the Esquimaux dog is very similar to that of our shepherds' dogs in England, but he is more muscular and broad chested, owing to the constant and severe work to which he is brought up. In size, a fine dog is about the height of the Newfoundland breed, but broad like a mastiff in every part except the nose. Young dogs are put into harness as soon as they can walk, and being tied up, soon acquire a habit of pulling in their attempts to recover their liberty, or to roam in quest of their mother. When about two months old, they are put into the sledge with the grown dogs, and sometimes eight or ten little ones are under the charge of some steady old animal, where with frequent, and sometimes cruel beatings, they soon receive a competent education."

In another passage Captain Lyon says, "Our eleven dogs were large, and even majestic looking animals; and an old one of peculiar sagacity, was placed at their head by having a longer trace, so as to lead them through the safest and dryest place; these animals having such a dread of water, as to receive a severe beating before they would swim a foot. The leader was instant in obeying the voice of the driver, who never beat, but repeatedly called to him by name. When the dogs slackened their pace, the sight of a seal or bird was sufficient to put them instantly to their full speed; and even though none of these might be seen on the ice, the cry of 'a seal! a seal!'—'a bear!'—'a bird!' &c. was enough to give play to the legs and voices of the whole pack. It was a beautiful sight to observe the two sledges racing at full speed to the same object, the dogs and men in full cry, and the vehicles splashing through the holes of water with the velocity and spirit of rival stage coaches. * * * The driver sits on the fore part of the vehicle, from whence he jumps when requisite to pull it clear of any impediments which may be in the way. The voice and long whip answer all the purposes of reins, and the dogs can be made to turn a corner, as dexterously as horses, though not in such an orderly manner; since they are constantly fighting; and I do not recollect to have seen one receive a flogging without instantly state among the poor in temperate climates; being transported into the colder regions, he grows less and more ugly among the Laplanders; but becomes more perfect in Iceland, Russia, and Siberia, where the climate is less rigorous, and the people more civilized. Whatever differences there may be among the dogs of these countries, they are not very considerable, as they all have straight ears, long and thick hair, a savage aspect, and do not bark either so often or so loud as dogs of the more cultivated kind.

The shepherd's dog, transported into the temperate climates, and among people entirely civilized, such as England, France, and Germany, will be divested of his savage air, his pricked ears, his rough, long, and thick hair, and, from the single influence of climate and food alone, will become either a matin, a mastiff, or a hound. These three seem the immediate descendants of the former; and from them the other varieties are produced.*

" With regard to the dogs of our country in particular, the varieties are very great, and the number every day increasing.† And this must happen in a

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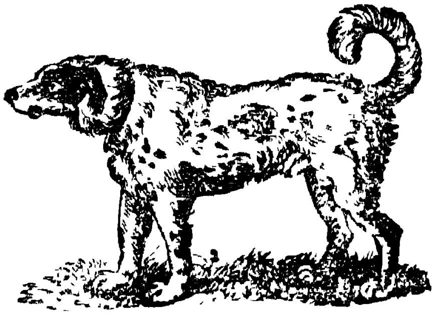
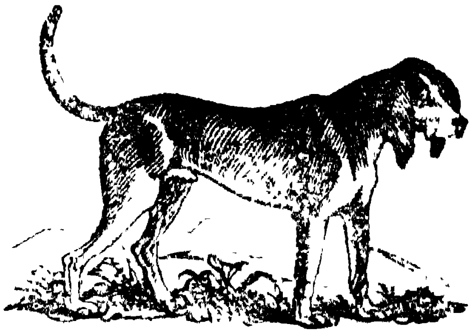
wreaking his passion on the ears of his neighbours. The cries of the men are not more melodious than those of the animals; and their wild looks and gestures, when animated, give them an appearance of devils driving wolves before them."



(Newfoundland Dog.)

* Domestication of Animals.—It appears that what we call the domestication of animals, consists in our becoming members of the society which these animals form among themselves. Man becomes the chief of its herd; from the moment that an animal admits man as a member of its society, it is domesticated,—" as a man could not enter into such society without becoming the chief of it." Applying these principles to wild animals, the apes and monkeys, notwithstanding their social instinct and intellect, are yet so violent and irritable, as to be incapable of all useful subjection. Among carnivorous animals, the seals, together with the various species of the dog tribe, would be the best adapted to attach themselves to us, and serve us. M. Cuvier suggests, that the seal might be trained for fishing, as the dog is for hunting. Several animals peculiar to South America, having but very feeble means of defence, will, as that country is peopled, gradually disappear from the face of the earth. After other illustrations, the writer concludes, that all domestication is founded on the propensity which animals have to live together in herds, and to attach themselves to one another. " We obtain it only by enticement, and principally by augmenting their wants, and satisfying them. But we could only produce domestic individuals, and not races, without the concurrence of one of the most general laws of life, the transmission of the organic or intellectual modifications by generation. Here one of the most astonishing phenomena of nature manifests itself to us, the transformation of a fortuitous modification into a desirable form; of a fugitive want into a fundamental propensity; of an incident habit into an instinct. This subject is assuredly worthy of exciting the attention of the most accurate observers, and of occupying the meditations of the most profound thinkers."---Arcana of Science 1829.

† Dogs in ancient times in England.—King John was particularly attached to the sports of the field, and his partiality for fine horses, hounds and hawks, is evident, by many records, such as receiving these animals by way of payment, instead of money, for the renewal of grants, fines, and forfeitures belonging to the crown. Edward the Third took so much delight in hunting, that even at the time he was engaged in war with France, and resident in that country, he had with him in his army, sixty couple of stag hounds, and as many hare hounds, and every



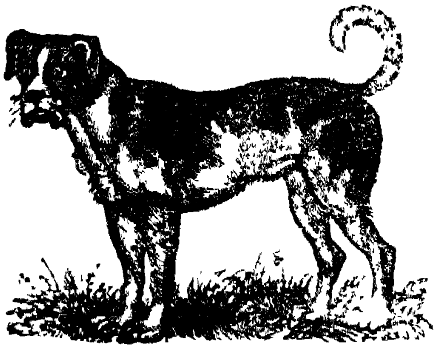
(Old English Hound.)

THE SPANIEL.

BEAGLES AND TERRIER. Page 137.

untry so open by commerce to all others, and where wealth is apt to produce capricious predilection. Here the ugliest and the most useless of their kinds will be entertained merely for their singularity; and, being imported only to be looked at, they will lose even that small degree of sagacity which they possesse in their natural climates. From this importation of foreign, useless dogs, our own native breed is, I am informed, greatly degenerated, and the varieties now to be found in England, much more numerous than they were in the times of Queen Elizabeth, when Dr. Caius attempted their natural history. Some of these he mentions are no longer to be found among us, although many have since been introduced, by no means so serviceable as those which have been suffered to decay.

"He divides the whole race into three kinds. The first is, the generous kind, which consists of the terrier, the harrier, and the blood hound; the gaze-hound, the grey-hound, the leymmer, and the tumbler: all these are used for hunting. Then the spaniel, the setter, and the water-spaniel, or finder, were used for fowling; and the spaniel, gentle, or lap-dog, for amusement. The second is the farm kind, consisting of the shepherd's dog and the mastiff. And the third is the mongrel kind; consisting of the wappe, the turn-spit, and the dancer. To these varieties we may add at present, the bull-dog, the Dutch mastiff, the harlequin, the pointer and the Dane, with a variety of lap-dogs, which, as they are perfectly useless, may be considered as unworthy of a name.


(Mastiff)

The terrier is a small kind of hound,(g) with rough hair, made use of to force the fox or the badger out of their holes: or rather to give notice by their barking, in what part of their kennel the fox or badger resides, when the sportsmen intend to dig them out.

"The grey-hound is very well known at present, and was formerly held in such estimation, that it was the peculiar com-

day he amused himself with hunting and hawking It also appears, that many of the great lords, in the English army, had their hounds and their hawks, as well as the king: to this may be added from the same author, that is Froissart, who was himself a witness to the fact, that Gaston Earl of Foix, a foreign nobleman contemporary with king Edward, kept upwards of six hundred dogs in his castle for the purpose of hunting.

James the first prefered this amusement to hawking or shooting. One time when he was on a hunting party near Bury St. Edmunds, he saw an opulent townsman, who had joined the chase, "very brave in his approach, and so glittering and radiant, that he eclipsed all the court." The king was desirous of knowing the name of this gay gentleman, and being informed by one of his followers, that it was Lamme, he facetiously replied, "Lamb, call you him? I know not what kind of lamb he is, but I am sure he has got a good fleece upon his back" Thus it seems that even the puns of royalty are worthy of record."—Strutt's Sports and Pastimes.

The Book of St. Albans. "In the treatise on hunting, well known by the name of the Book of St. Albans, we find the following names for the dogs employed in the sports of the field; that is to say, raches, or hounds; running hounds, or harriers, to chase hares; and grey-hounds, which were favourite dogs with the sportsmen; alauntes, or bull-dogs, these were chiefly used for hunting the boar; the mastiff is also said to be 'a good hounde' for hunting the wild boar; the spaniel was of use in hawking:—'hys craft,' says the author, 'is for the perdrich or partridge, and the quaile; and, when taught to couch, be very serviceable to the fowlers, who take those birds with nets.' There must, I presume, have been a vast number of other kinds of dogs known in England at this period; these, however, are all that the early writers, upon the subject of hunting, have thought proper to enumerate In the sixteenth century the list is enlarged, besides those already named, we find bastards and mongrels, lemons, kenets, tenouns, butche's hounds, dunghill dogs, trundel-tail'd dogs, 'pryck-eareard' curs, and ladies small puppies."—Strutt's Sports and Pastimes.

(g) British Zoology.

panion of a gentleman; who, in the times of semi-barbarism, was known by his horse, his hawk, and his grey-hound. Persons under a certain rank of life are forbidden, by some late game-laws from keeping this animal; wherefore, to disguise it the better, they cut off its tail.

The land spaniel, which probably had its name from Spain, where it might have acquired the softness of its hair, is well known at present. There are two varieties of this kind; namely, the slater, used in hawking to spring the game: and the setter, that crouches down when it scents the birds, till the net be drawn over them. I have read somewhere that the famous poet, Lord Surry, was the first who taught dogs to set; it being an amusement to this day only known in England.

The water spaniel was another species used in fowling. This seems to be the most docile of all the dog kind; and this docility is particularly owing to his natural attachment to man. Many other kinds will not bear correction; but this patient creature, though very fierce to strangers, seems unalterable in his affections; and blows and ill-usage seem only to increase his regard.

With regard to those of later importation, the bull-dog, as Buffon supposes, is a breed between the small Dane and the English mastiff. The large Dane is the tallest dog that is generally bred in England. It is somewhat between a mastiff and a grey-hound in shape, being more slender than the one, and much stronger than the other. They are chiefly used rather for show than service, being neither good in the yard nor the field. The highest are most esteemed; and they generally cut off their ears to improve their figure, as some absurdly suppose. The harlequin is not much unlike the small Dane, being an useless animal, somewhat between an Italian grey-hound and a Dutch mastiff. To these several others might be added, such as the pug-dog, the black breed, and the pointer; but, in fact, the varieties are so numerous, as to fatigue even the most ardent curiosity.*

(Bull Dog.)

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* The Cuban Mastiff — The dog, so named, in the annexed cut, is from Cuba, and partakes of the characters of the Spanish bull-dog and English mastiff, and seems to be completely intermediate in form between the two. It is larger than our common bull-dog, and smaller than the mastiff, well made and rather stout in its proportions, moderately high upon its legs, muscular and powerful Notwithstanding the apparent capacity of its cranium, the dogs of this tribe are by no means remarkable for their intelligence. They are, however, eminently faithful, and as courageous as they are powerful. They are consequently chosen in preference to all others, for house-guards and watch-dogs, and are also in much request, wherever such sports are encouraged, for bull fights and other similar exhibitions of brutality. For their legitimate purposes they are a most useful race. A fine pair of this species occur in the collection in Regent's Park. The society's specimens are in general, the female particularly, tolerably good tempered, but they will not bear any provocation.

(Cuban Mastiff.)

The Dog of Thibet —These noble animals are the watch-dogs of the table land of the Himmalaya mountains about Thibet. Their masters, the Bhoteas, to whom they are most strongly attached, are a singular race, of a ruddy copper-colour, indicating the bracing air which they breathe; rather short, but of an excellent disposition. Their clothing is adapted to the cold climate which they inhabit, and consists of fur and woollen cloth. The men till the ground and keep sheep, and at certain seasons come down to

Of these of the foreign kinds, I shall mention only three, which are more remarkable than any of the rest. The lion dog greatly resembles that animal, in miniature, from whence it takes the name. The hair of the forepart of the body is extremely long, while that of the hinder part is as short. The nose is short, the tail long, and tufted at the point, so that in all these particulars it is entirely like the lion. However, it differs very much from that fierce animal in nature and disposition, being one of the smallest animals of its kind, extremely feeble, timid, and inactive. It comes originally from Malta, where it is found so small, that women carry it about in their sleeves.

That animal falsely called the Turkish dog, differs greatly from all the rest of the kind, in being entirely without hair. The skin, which is perfectly bare, is of a flesh colour, with brown spots; and their figure at first view is rather disgusting. These seem to be of the small Danish breed, brought into a warm climate, and there, by a succession of generations, divested of their hair. For this reason, they are extremely chilly, and unable to endure the cold of our climate; and even in the midst of summer they continue to shiver as we see men in a frosty day. Their spots are brown, as was said, well marked, and easily distinguishable in summer, but in the cold of winter they entirely disappear. They are called the Turkish breed, although brought from a much warmer climate: for some of them have been known to come from the warmest parts of Africa and the East Indies.

"The last variety, and the most wonderful of all that I shall mention, is the great Irish wolf-dog; that may be considered as the first of the canine species. This animal, which is very rare, even in the only country in the world where it

(Thibet Dog.)

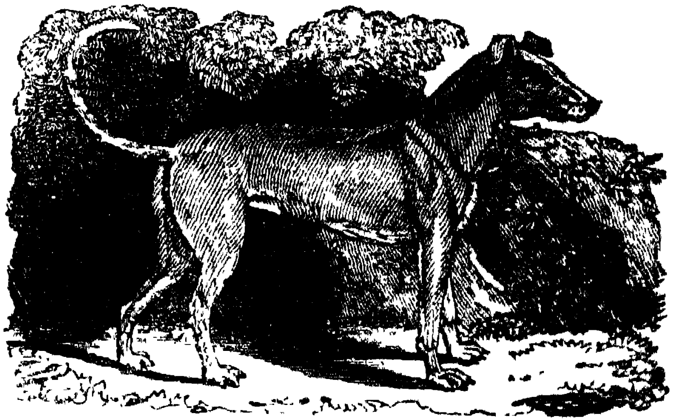
trade, bringing borax, tincal, and musk for sale. They sometimes penetrate as far as Calcutta. On these occasions the women remain at home with the dogs, and the encampment is watched by the latter, which have an almost irreconcileable aversion to Europeans, and in general fly ferociously at a white face. A warmer climate relaxes all their energies, and they dwindle even in the valley of Nipal.

Dr. Wallace brought a pair of these dogs to this country for the Hon. East India Company, by whom they were presented to His Majesty, and placed by the latter in the gardens in Regent's Park. They died shortly after their arrival.

To the foregoing account we can only append a few additional details derived from the relations of those travellers by whom these dogs have been more particularly noticed. The first of these is Captain Turner, who thus introduces them in his Account of an Embassy to the Court of the Teshoo Lama, in Thibet, published in 1800. "The mansion (of the rajah of Bootan) stood upon the right; on the left was a row of wooden cages containing a number of large dogs, tremendously fierce, strong, and noisy. They were natives of Thibet; and whether savage by nature, or soured by confinement, they were so impetuously furious, that it was unsafe, unless the keepers were near, even to approach their dens."

A few pages further on our author exhibits them in a much more favourable point of view, as the watchful guardians of the fold. But the most characteristic anecdotes respecting them, furnished by Captain Turner, is thus related. Entering a Thibet village, and "being," he says, "indolently disposed, and prompted by mere curiosity, I strolled alone among the houses: and seeing every thing still and quiet, I turned into one of the stone inclosures, which serve as folds for cattle. The instant I entered the gate, to my astonishment, up started a huge dog, big enough, if his courage had been equal to his size, to fight a lion. He kept me at bay with a most clamorous bark, and I was a good deal startled at first; but recollecting their cowardly disposition, I stood still; for having once had one in my possession, I knew that they were fierce only when they perceived themselves feared. If I had attempted to run, he probably would have flown upon me, and torn me in pieces, before any one could have come to my rescue. Some person came out of the house, and he was soon silenced."

is to be found, is rather kept for show than use, there being neither wolves nor any other formidable beasts of prey in Ireland, that seem to require so powerful an antagonist. The wolf-dog is therefore bred up in the houses of the great, or such gentlemen as choose to keep him as a curiosity, being neither good for hunting the hare, the fox, nor the stag, and equally unserviceable as a house dog. Nevertheless, he is extremely beautiful and majestic to appearance, being the greatest of the dog kind to be seen in the world. The largest of those I have seen, and I have seen above a dozen, was about four feet high, or as tall as a calf of a year old. He was made extremely like a grey-hound, but rather more robust, and inclining to the figure of the French matin, or the great Dane. His eye was mild, his colour white, and his nature seemed heavy and phlegmatic. This I ascribe to his having been bred up to a size beyond his nature; for we see in man, and all other animals, that such as are overgrown are neither so vigorous nor alert as those of more moderate stature. The greatest pains have been taken with these to enlarge the breed, both by food and matching. This end was effectually obtained, indeed; for the size was enormous; but, as it seemed to me, at the expense of the animal's fierceness, vigilance, and sagacity. However, I was informed otherwise; the gentlemen who bred them assuring me that a mastiff would be nothing when opposed to one of them, who generally seized their antagonist by the back; he added, that they would worry the strongest bull-dogs, in a few minutes, to death. But this strength did not appear either in their figure or their inclinations; they seemed rather more timid than the ordinary race of dogs; and their skin was much thinner, and consequently less fited for combat. Whether with these disadvantages they were capable, as I was told, of singly coping with bears, others may determine; however, they have but few opportunities, in their own country, of exerting their strength, as all wild carnivorous animals there are only of the vermin kind. Buffon seems to be of opinion that these are the true Molossian dogs of the ancients; he gives no reason for this opinion; and I am apt to think it ill grounded. Not to trouble the reader with a tedious critical disquisition, which I have all along avoided, it will be sufficient to observe, that Nemesianus, in giving directions for the choice of a bitch, advises to have one of Spartan or Molossian breed; and among several other perfections, he says that the ears should be dependent, and fluctuate as she runs.(*g*) This, however, is by no means the case with the Irish wolf-dog, whose ears resemble those of the grey-hound, and are far from fluctuating with the animal's motions.[*] But of whatever kinds these dogs may be,



(Irish Wolf Dog.)

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[*] THE SCOTTISH HIGHLAND GREY-HOUND, OR WOLF DOG.—This is a large and powerful dog, nearly equal in size to the Irish grey-hound. His general aspect is commanding and fierce; his head is long, and muzzle rather sharp; his body is very strong and muscular; his hind quarters are furnished with large, prominent muscles, and his legs are long, strong-boned and straight, a combination of qualities which gives him that speed and long duration in the chase for which he is so eminently distinguished. His hair is shaggy and wiry, of a reddish sand colour, mixed with white, his tail is rough, which he carries somewhat in the manner of a stag-hound, but not quite so erect. This

(*g*) Elige tunc cursu facilem, facilemque recursu,
In Lacedæmonio natam seu rure Molosso—
Renibus ampla satis validis, diductaque coxas
Cuique nimis molles fluitent in cursibus aures.—NEMESIAN.

whether known among the ancients, or whether produced by a later mixture, they are now almost quite worn away, and are very rarely to be met with even in Ireland. If carried to other countries, they soon degenerate; and even at home, unless great care be taken, they quickly alter. They were once employed in clearing they island of wolves, which infested it in great plenty; but these being destroyed, the dogs also are wearing away, as if nature meant to blot out the species, when they had no longer any services to perform.*

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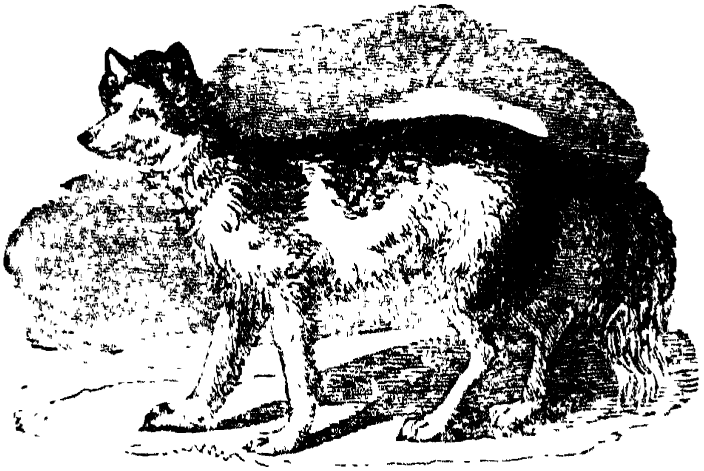
is the dog formerly used by the highland chieftains of Scotland in their grand hunting parties, and is in all probability, the same noble dog used in the time of Ossian. It will either hunt in packs or singly. A remarkably fine and large dog of this description was long in the possession of the late Sir Walter Scott, and was a most appropriate guardian for his unique and hallowed seat, Abbotsford. This splendid dog was presented to Sir Walter as a mark of the highest respect and esteem by the late chieftain Macdonell of Glengarry. He preserved the race of dogs with much care; and, in order to prevent the degeneracy which arises from consanguinity, he was in the practice of crossing the breed with the blood-hound from Cuba, and also with the shepherd's dog of the Pyrenees, which is distinguished for its size, beauty, and docility. Sir Walter Scott's Maida, was the offspring of a sire of the latter species, and a dam of the Scottish Highland race; and certainly was one of the finest dogs of the kind that was ever seen in this country, not only on account of his symmetry of form and dignified aspect, but also from his extraordinary size and strength.

This fine specimen of the dog, probably brought on himself premature old age by the excessive fatigue and exercise to which his natural ardour inclined him; for he had the greatest pleasure in accompanying the common grey-hounds—and although from his great size and strength he was not at all adapted for coursing, yet he not unfrequently turned and ran down even hares. Maida lies buried at the gate of Abbotsford, which he long protected; a grave-stone is placed over him, with a figure of a dog cut on it by Mr. Smith, of Melrose, and bears the following inscription:—

Maida, tu marmorea dormis sub imagine Maidæ
Ad januam domini. Sit tibi terra levis!

* THE HARE-INDIAN DOG.—The Mackenzie river, or, as Dr. Richardson has prefered naming it, the Hare-Indian dog, is of small size and slender make. Its muzzle is narrow, elongated, and pointed; its ears broad at the base, pointed at the tip, and perfectly erect; its legs rather long and delicate; and its tail thick, bushy, and curved slightly upwards, but not by any means with the decided curl of the Esquimaux. Its body is covered with long, straight hairs, the ground-colour of which is white, marked with large irregular patches of greyish black intermingled with various shades of brown. The ears are covered on the outside with short, brown hair, which becomes blackish towards the margin and at the base, that of the inside is longer and white. On the muzzle the hair is white and very short, as also on the legs, but becomes thicker and somewhat longer on the feet, and is continued to the very extremities of the toes.


(The Hare-Indian Dog.)

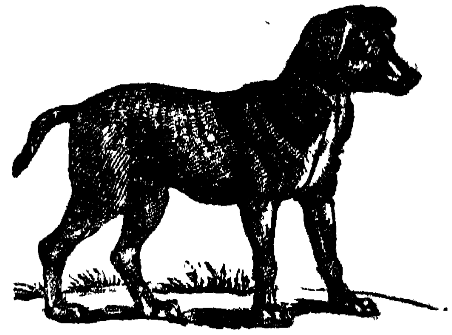
Dr. Richardson suspects that this variety of the dog "was perhaps formerly generally spread over the northern parts of America; but being fitted only for the chase, it has, since the introduction of guns, gradually given way to the mongrel race sprung from the Esquimaux, Newfoundland, and this very breed, with occasional intermixture of European kinds." It seems at present to be peculiar to the Hare-Indians and other tribes frequenting the banks of the Mackenzie river and Great Bear lake, in the neighbourhood of which our enterprising countrymen, Captain Sir John Franklin and Dr. Richardson, wintered with their party, previously to setting forth on their late hazardous but eminently successful expedition to explore the northern coasts of the American continent. A pair of these graceful and elegant animals

In our climate, the wild animals that most approach the dog are the wolf and the fox; these in their internal conformation, greatly resemble each other, and yet in their natures are very distinct. The ancients asserted that they bred together; and I am assured by credible persons, that there are many animals in this country bred between a dog and a fox. However, all the endeavours of Buffon to make them engender, as he assures us, were ineffectual. For this purpose, he bred up a young wolf, taken in the woods, at two months old, with a matin dog of the same age. They were shut up together, without any other, in a large yard, where they had a shelter for retiring. They neither of them knew any other individual of their kind, nor even any other man but he who had the charge of feeding them. In this manner they were kept for three years; still with the same attention, and without constraining or tying them up. During the first year the young animals played with each other continually, and seemed to love each other very much. In the second year they began to dispute about their victuals, although they were given more than they could use. The quarrel always began on the wolf's side. They were brought their food, which consisted of flesh and bones, upon a large wooden platter, which was laid on the ground. Just as it was put down, the wolf, instead of falling to the meat, began by driving off the dog; and took the platter in his teeth so expertly, that he let nothing of what it contained fall upon the ground; and in this manner carried it off; but as he could not entirely escape, he was frequently seen to run with it round the yard five or six times, still carrying it in a position that none of its contents could fall. In this manner it would continue running, only now and

were brought away by the travellers on their return, and presented to the Society soon after their arrival in England, where the third was whelped. These, we believe, are the only individuals of the race, that have ever been seen in Europe. In their native country they are never known to bark, and this peculiarity is still retained by the elder dogs; but the younger one, which was born in this country, has learned to imitate the language of its fellows. They appear to be extremely valuable to the Indians by whom they are bred, who subsist almost entirely on the produce of the chase. "The Hare-Indian dog," says Dr. Richardson, "has neither courage nor strength to fit it for pulling down any of the larger animals; but its broad feet and light make enable it to run over the snow without sinking, if the slightest crust is formed on it, and thus easily to overtake and tease the moose or rein-deer, and keep them at bay until the hunters come up. — Arcana of Science, 1830.

Sleuth-Hound, or Blood-Hound — In those ages when might was very often right, the blood-hound was employed in tracing the foot of trespassers, and hunting even to death, the unfortunate men; and there are tales of woe to be gathered from the annals of many countries, in which this terrific animal was the prominent instrument. The stag, the wolf, the wild-boar, were, also his quarry; and when these were once struck by the hunters, and the sleuth-hound laid on, nor speed, nor cunning, nor the rock, nor the river, the pass, nor the mountain, could save them from the determined and sanguinary pursuit. His large long tail erect, his deep ears brushing the dews, and his nose almost close to the earth, he sped onward to the chase of blood, and fainted not till the prey dropped before him.

—" No haunt unsearch'd, they drive
From every covert, and from every den,
The lurking savages.



(Blood-Hound.)

An instance of the determined character of the animal may be drawn from the following anecdote:—" A servant, discharged by a northern sporting gentleman, broke into his stables, by night, and cut off the ears and tail of a favourite hunter. An alarm by the dogs was raised within an hour, and a blood-hound brought into the stable, which immediately clapped on a scent, traced it upwards of twenty miles, stopping at the door of a certain house, from which he could not be removed; on being admitted he ran to the top of the house, and, bursting open the door of the garret, found his object in bed, whom he instantly seized, and would have torn to pieces, but for the huntsman, who was fortunately at his heels."—Ed.

then stopping to take breath, until the dog coming up, the wolf would leave the victuals to attack him. The dog, however, was the stronger of the two; but as it was more gentle, in order to secure him from the wolf's attack, he had a collar put round his neck. In the third year, the quarrels of these ill-paired associates were more vehement, and their combats more frequent; the wolf, therefore, had a collar put about his neck, as well as the dog, who began to be more fierce and unmerciful. During the two first years, neither seemed to testify the least tendency towards engendering; and it was not till the end of the third, that the wolf, which was the female, showed the natural desire, but without abating either in its fierceness or obstinacy. This appetite rather increased than repressed their mutual animosity; they became every day more intractable and ferocious, and nothing was heard between them but the sounds of rage and resentment. They both, in less than three weeks, became remarkably lean, without ever approaching each other, but to combat. At length, their quarrels became so desperate, that the dog killed the wolf, who was become more weak and feeble; and he was soon after himself obliged to be killed, for, upon being set at liberty, he instantly flew upon every animal he met, fowls, dogs, and even men, th selves, not escaping his savage fury.*

The same experiment was tried upon foxes, taken young, but with no bette success; they were never found to engender with dogs; and our learned naturalist seems to be of opinion that their natures are too opposite ever to provoke mutual desire. One thing, however, must be remarked, that the animals on which he tried his experiments were rather too old when taken, and had partly acquired their natural savage appetites before they came into his possession. The wolf, as he acknowledges, was two or three months old before it was caught, and the foxes were taken in traps. It may, therefore, be easily supposed that nothing could ever after thoroughly tame those creatures, that had been suckled in the wild state, and had caught all the habitudes of the dam.

The dog, when first whelped, is not a completely finished animal. In this kind, as in all the rest which bring forth many at a time, the young are not so perfect as in those which bring forth but one or two. They are always produced with the eyes closed, the lids being held together, not by sticking, but by a kind of thin membrane, which is torn as soon as the upper eye-lid becomes strong enough to raise it from the under. In general, their eyes are not opened till ten or twelve days old.

This animal is capable of reproducing at the age of twelve months, (*g*) goes nine weeks with young, and lives to about the age of twelve. Few quadrupeds are less delicate in their food; and yet there are many kinds of birds which the dog will not venture to touch He is even known, although in a savage state, to abstain from injuring some which one might suppose he had every reason to oppose. The dogs and the vultures which live wild about Grand Cairo, in Egypt, (for the Mahometan law has expelled this useful animal from human society,) continue together in a very sociable and friendly manner.(g) As they are both useful in devouring such carcasses as might otherwise putrefy, and thus infect the air, the inhabitants supply them with provisions every day, in order to keep them near the city. Upon these occasions the quadrupeds and birds are often seen together, tearing the same piece of flesh, without the least enmity; on the contrary, they are known to live together with a kind of affection, and bring up their young in the same nest.

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* MONGRELS BETWEEN A DOG AND A SHE WOLF.—Dr. A. F. Wiegmann, jun., relates the following circumstance as occurring at the Isle of Peacocks, near Potsdam. A setter dog copulated with a she wolf; and she afterwards gave birth to three female pups, differing very much from each other. One, which died, resembled a wolf more than the two others, particularly in the hair, having, on the anterior parts of the legs, the black line which characterizes that animal. The second also resembled the mother, excepting in the position of the eyes, which was the same as in the dog. The third was, properly speaking, a setter dog, but imperfect in some respects; its character was gentle, whilst the others had a ferocious appearance. The father was white, with brown spots; of the little ones, on the contrary, the first had the hair and colour of the wolf; the second was white on the throat, cheeks, and on the sides of the neck, and black on the back; and the third had a white band on the fore part of the neck, and between the legs, the back of the same colour as the second, and the ears rounded, pendent, and of moderate length. The tail was not erected in any of the three. —ARCANA OF SCIENCE, 1832.

(*g*) To this description I will beg leave to add a few particulars from Linnæus, as I find them in the original. Vomitua gramina purgatur: cacat supra lapidem. Album græcum antisepticum summum. Mingit ad latus (this, however, not till the animal is nine months old) cum hospite sæpe centies. Odorat anum alterius. Procis rixantibus crudelis. Menstruans coit cum variis. Mordet illa illos. Cohæret copula junctus.

Although the dog is a voracious animal, yet he can bear hunger for a very long time. We have an instance, in the Memoirs of the Academy of Sciences, of this kind, in which a bitch, that had been forgotten in a country house, lived forty days, without any other nourishment than the wool of a quilt which she had torn in pieces. It should seem that water is more necessary to the dog than food; he drinks often, though not abundantly; and it is commonly believed, that when abridged in water, he runs mad. This dreadful malady, the consequences of which are so well known, is the greatest inconvenience that results from the keeping of this faithful domestic. But it is a disorder by no means so frequent as the terrors of the timorous would suppose; the dog has been often accused of madness, without a fair trial; and some persons have been supposed to receive their deaths from his bite, when either their own ill-grounded fears, or their natural disorders, were the true cause.*

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* **HYDROPHOBIA.**—Hydrophobia has for ages been dreaded, and no subject is more involved in error than the origin and consequence of this dreadful malady. It is generally supposed that a dog affected with *madness*, as it is called, must be wild; but in a full-grown dog, with few exceptions, the mental faculties remain undisturbed, as the unhappy sufferers commonly know the voice of their masters, and sometimes exhibit symptoms of obedience. Another popular prejudice, more dangerous than the preceding, is that a dread of water is *always* a universal characteristic of the complaint; but the truth is, that rabid dogs *sometimes* seek water with the greatest avidity.

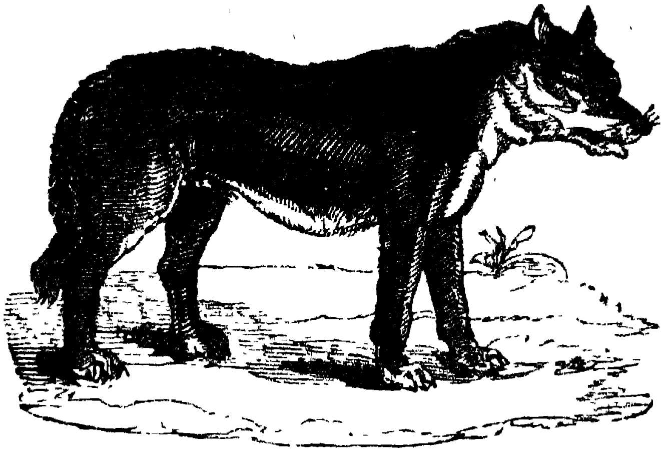
Dogs go mad sometimes without any *apparent* cause. Heat may be justly considered to accelerate the disease, as likewise great fatigue; though these do not give rise to it, for we have Barrow's authority in stating that it is almost unknown over the vast continent of South America. Seasons have been said to cause madness; but the following table, extracted from the *Memoirs of the Royal Society of Paris*, will show how little reliance can be placed on that opinion.

	Wolves.	Cats.	Dogs.
January	1	1	3
February	4	1	12
March	6	0	5
April	6	1	8
May	0	0	16
June	2	0	8
July	2	2	13
August	1	1	8
September ...	0	2	10
October	0	0	8
November....	3	0	9

It has been received as a popular opinion, that the saliva of a human being under rabid hydrophobia, when applied to an abraded surface, was capable of producing the disease in another; but Drs. Vaughan and Babington submitted the matter to experiment, on dogs and other animals, without effect. A week is the shortest period between the bite and the rabid appearances, though instances are on record of an earlier developement. The following is a well attested fact:—On the day of his marriage, a young man was bitten on the leg by a strange dog; no notice was taken of this, and the day was spent with the usual festivity; but the next morning he was found to have literally torn out the entrails of his unhappy bride, and to have perished himself with every symptom of rabies. The excitement contingent on his nuptials, had, no doubt, accelerated the operation of the fatal poison.

DOGS OF THE EAST—PARIAHS.—The dogs of the East Indians, known by the name of *pariahs*, a troublesome breed of curs, are not remarkable for bravery. They are frequently thrown into the cages of tigers, by those persons who keep the royal beast of Bengal, as objects of sport to be by them destroyed. It has not always happened that the tiger has killed the *pariah* put into his cage. Captain Williamson informs us of an instance of one that was devoted to destruction, and which was expected to become the tiger's "daily bread," which stood on its defence in a manner that completely astonished both tiger and spectators. "He crept into a corner, and whenever the tiger approached, seized him by the lip or the nose, making him roar piteously! The tiger, impelled, however, by appetite, for

(g) Hasselquist Her. Palæstin, p. 232.



(The Wolf.)

THE WOLF.—The dog and the wolf are so very much alike internally, that the most expert anatomists can scarce perceive the difference; and it may be asserted also, that, externally, some dogs more nearly resemble the wolf than they do each other. It was this strong similitude that first led some naturalists to consider them as the same animal, and to look upon the wolf as the dog in its state of savage freedom: however, this opinion is entertained no longer; the natural antipathy those two animals bear to each other, the longer time which the wolf goes with young than the dog, the one going over a hundred days, and the other not quite sixty;[*] the longer period of life in the former than the latter, the wolf living twenty years, the dog not fifteen; all sufficiently point out a distinction, and draw a line that must for ever keep them asunder.

The wolf, from the tip of the nose to the insertion of the tail, is about three feet seven inches long, and about two feet five inches high; which shows him to be larger than our great breed of mastiffs, which are seldom found to be above three feet by two. His colour is a mixture of black, brown, and grey, extremely rough and hard, but mixed towards the roots with a kind of ash-coloured fur. In comparing him to any of our well-known breed of dogs, the great Dane, or mongrel grey-hound, for instance, he will appear to have the legs shorter, the head larger, the muzzle thicker, the eyes smaller and more separated from each other, and the ears shorter and straighter. He appears, in every respect, stronger than the dog; and the length of his hair contributes still more to his robust appearance. The feature which principally distinguishes the visage of the

no other supply was given him for several days, would renew the attack. The result was ever the same. At length the tiger began to treat the dog with more deference, and allowed him not only to eat the mess of rice and meat furnished for his daily subsistence, but even refrained from any attempt to disturb his rest. The two animals after some weeks became completely courteous, and each showed symptoms of attachment to his companion. But what is extraordinary, the dog, on being allowed free ingress and egress through the aperture, considered the cage as his home, always returning to it with confidence; and when the tiger died, moaning for want of his companion."—ORIENTAL FIELD SPORTS.

PRIVILEGES OF LONDONERS.—The citizens of London were permitted to hunt and hawk in certain districts. And one of the clauses in the royal charter granted to them by Henry the First, runs to this purport:—"The citizens of London may have chases, and hunt as well and as fully as their ancestors have had; that is to say, in the Chiltre, in Middlesex, and Surrey." Hence we find that these privileges were of ancient standing. They were also confirmed by the succeeding charters. Fitzstephen, who wrote towards the close of the reign of Henry the Second, says, that the Londoners delight themselves with hawks and hounds, for they have the liberty of hunting in Middlesex, Hertfordshire, all Chilton, and in Kent to the waters of Grey; which differs somewhat from the statement in the charter. These exercises were not much followed by the citizens of London at the close of the sixteenth century. Strype, however, so late as the reign of George the First, reckons among the modern amusements of the Londoners, "riding on horseback, and hunting with my lord mayor's hounds, when the common hunt goes out.—STRUTT'S SPORTS AND PASTIMES.

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[*] This is inaccurate. The female wolf goes with young sixty-three days, and has eight or nine in a litter.—ED.

wolf from that of the dog, is the eye, which opens slantingly upwards, in the same direction with the nose; whereas, in the dog, it opens more at right angles with the nose, as in man. The tail also, in this animal, is long and bushy; and he carries it rather more between his hind legs than the dog is seen to do. The colour of the eye-balls in the wolf are of a fiery green, and gives his visage a fierce and formidable air, which his natural disposition does by no means contradict. (g) *

The wolf is one of those animals whose appetite for animal food is the most vehement; and whose means of satisfying this appetite are the most various. Nature has furnished him with strength, cunning, agility, and all those requisites which fit an animal for pursuing, overtaking, and conquering its prey; and yet, with all these, the wolf most frequently dies of hunger, for he is the declared enemy of man. Being long proscribed, and a reward offered for his head, he is obliged to fly from human habitations, and to live in the forest, where the few wild animals to be found there escape him either by their swiftness or their art, or are supplied in too small a proportion to satisfy his rapacity. He is naturally dull and cowardly; but frequently disappointed, and as often reduced to the verge of famine, he becomes ingenious from want, and courageous from necessity. When pressed with hunger, he braves danger, and comes to attack those animals which are under the protection of man, particularly such as he can readily carry away, lambs, sheep, or even dogs themselves, for all animal food becomes then equally agreeable. When this excursion has succeeded, he often returns to the charge, until having been wounded or hard pressed by the dogs or the shepherds, he hides himself by day in the thickest coverts, and only ventures out at night; he then sallies forth over the country, keeps peering round the villages, carries off such animals as are not under protection, attacks the sheep-folds, scratches up and undermines the thresholds of doors where they are housed, enters furiously, and destroys all before he begins to fix upon and carry off his prey. When these sallies do not succeed, he then returns to the thickest part of the forest, content to pursue those smaller animals, which, even when taken afford him but a scanty supply. He there goes regularly to work, follows by the scent, opens to the view, still keeps following, hopeless himself of overtaking the prey, but expecting that some other wolf will come in to his assistance, and then content to share the spoil. At last, when his necessities are very urgent, he boldly faces certain destruction; he attacks women and children, and sometimes ventures even to fall upon men, becomes furious by his continual agitations, and ends his life in madness.

The wolf, as well externally as internally, so nearly resembles the dog, that he seems modelled upon the same plan; and yet he only offers the reverse of the medal. If his form be like, his nature is so different, that he only preserves the ill qualities of the dog, without any of his good ones. Indeed, they are so different in their dispositions, that no two animals can have a more perfect antipathy to each other. A young dog shudders at the sight of a wolf; he even

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* COWARDICE OF THE WOLF.—Though the wolf is vulgarly considered to be a very terrific animal, his cowardice, unless when he is congregated in droves, has been years ago detected by those keen inquirers the poets. Cowley, speaking of them, says:

> "Such rage inflames the wolf's wild heart and eyes,
> Robb'd, as he thinks, unjustly of his prize;
> Whom unawares the shepherd spies, and draws
> The bleating lamb from out his ravenous jaws;
> The shepherd, fain himself he would assail,
> But fear above his hunger does prevail;
> He knows his foe's too strong, and must be gone;
> He grins as he looks back, and howls as he goes on."

The wolf may be easily domesticated. Mr. Graff says, "I reared up two young wolves until they were full-grown. They were male and female. The latter became so tame, that she played with me, and licked my hands, and I had her often with me in the sledge in winter. Once, when I was absent, she got loose from the chain she was bound with, and was away three days. When I returned, home, I went out on a hill, and called, "Where is my Tussa?" as she was named, when she immediately came home, and fondled with me like the most friendly dog. She could not bear other people."—LLOYD'S FIELD SPORTS.

(g) The rest of this history of the wolf is taken from Mr. Buffon, and I look upon it as a complete model for natural history. If I add or differ, I mark it as usual.

shuns his scent, which, though unknown, is so repugnant to his nature, that he comes trembling to take protection near his master. A dog who is stronger and who knows his strength, bristles up at the sight, testifies his animosity, attacks him with courage, endeavours to put him to flight, and does all in his power to rid himself of a presence that is hateful to him. They never meet without either flying or fighting; fighting for life and death, and without mercy on either side. If the wolf is the stronger, he tears and devours his prey: the dog, on the contrary, is more generous, and contents himself with his victory; he does not seem to think that *the body of a dead enemy smells well;* he leaves him where he falls, to serve as food for birds of prey, or for other wolves, since they devour each other; and when one wolf happens to be desperately wounded, the rest track him by his blood, and are sure to show him no mercy.

The dog, even in his savage state, is not cruel; he is easily tamed, and continues firmly attached to his master. The wolf, when taken young, becomes tame, but never has an attachment; nature is stronger in him than education: he resumes, with age, his natural dispositions, and returns, as soon as he can, to the woods from whence he was taken. Dogs, even of the dullest kinds, seek the company of other animals; they are naturally disposed to follow and accompany other creatures beside themselves; and even by instinct, without any education, take to the care of flocks and herds. The wolf, on the contrary, is the enemy of all society; he does not even keep much company with those of his kind. When they are seen in packs together, it is not to be considered as a peaceful society, but a combination for war: they testify their hostile intentions by their loud howlings, and by their fierceness discover a project for attacking some great animal, such as a stag or a bull, or to destroy some more redoubtable watch-dog. The instant their military expedition is completed, their society is at an end; they then part, and each returns in silence to his solitary retreat. There is not even any strong attachments between the male and female; they seek each other only once a year, and remain but a few days together: they always couple in winter; at which time several males are seen following one female, and this association is still more bloody than the former: they dispute most cruelly, growl, bark, fight, and tear each other; and it sometimes happens that the majority kill the wolf which has been chiefly prefered by the female. It is usual for the she wolf to fly from them all with him she has chosen; and watches this opportunity when the rest are asleep.

The season for coupling does not continue above twelve or fifteen days; and usually commences among the oldest, those which are young being later in their desires. The males have no fixed time for engendering; they pass from one female to the other, beginning at the end of December, and ending at the latter end of February. The time of pregnancy is about three months and a half; and the young wolves are found from the latter end of April to the beginning of July. The long continuance of the wolf's pregnancy is sufficient to make a distinction between it and the dog; did not also the fiery fierceness of the eyes, the howl instead of barking, and the greater duration of its life, leave no doubt of its being an animal of its own particular species. In other respects, however, they are entirely alike; the wolf couples exactly like the dog, the parts are formed in the same manner, and their separation hindered by the same cause. When the she-wolves are near their time of bringing forth, they seek some very tufted spot, in the thickest part of the forest; in the middle of this they make a small opening, cutting away the thorns and briars with their teeth, and afterwards carry thither a great quantity of moss, which they form into a bed for their young ones. They generally bring forth five or six, and sometimes even to nine at a litter. The cubs are brought forth, like those of the bitch, with the eyes closed; the dam suckles them for some weeks, and teaches them betimes to eat flesh, which she prepares for them, by chewing it first herself. Some time after she brings them stronger food, hares, partridges, and birds yet alive. The young wolves begin by playing with them, and end by killing them. The dam then strips them of their feathers, tears them in pieces, and gives to each of them a share. They do not leave the den where they have been littered, till they are six weeks or two months old. They then follow the old one, who leads them to drink to the trunk of some old tree where the water has settled, or at some pool in the neighbourhood. If she apprehends any danger, she instantly conceals them in the first convenient place, or brings them back to their former retreat. In this manner they follow her for some months; when they are attacked, she defends them with all her strength, and more than usual ferocity. Although at other times more timorous than the male, at that season she becomes bold and fearless; willing perhaps to teach the young ones future courage by her own example. It is not till they are about ten or twelve months old, and until they have shed their first teeth, and completed the new, that she thinks them in a capacity to shift for themselves. Then, when they have acquired arms from nature, and have learned industry and courage from her example, she declines all future care of them, being again engaged in bringing up a new progeny.*

The wolf grows grey as he grows old, and his teeth wear, like those of most other animals, by using. He sleeps when his belly is full, or when he is fatigued, rather by day than night; and always, like the dog, is very easily waked. He drinks frequently; and in times of drought, when there is no water to be found in the trunks of old trees, or in the pools about the forest, he comes often, in the day, down to the brooks or the lakes in the plain. Although very voracious, he supports hunger for a long time, and often lives four or five days without food, provided he be supplied with water.

The wolf has great strength, particularly in his fore-parts, in the muscles of his neck and his jaws. He carries off a sheep in his mouth without letting it touch

* Habits of Wolves.—During the arduous journeys of Captain Franklin to the shores of the Polar Sea, he and his companions were often obliged to dispute their scanty food with the prowling wolves of those inclement regions. On one occasion, when they had captured a moose-deer, and had buried a part of the body, the wolves absolutely dug it out from their very feet, and devoured it, while the weary men were sleeping. On another occasion, when the travellers had killed a deer, they saw, by the flashes of the aurora borealis, eight wolves waiting around for their share of the prey; and the intense howling of the ferocious animals, and the cracking of the ice by which they were surrounded, prevented them sleeping even if they had dared. But the wolves were sometimes caterers for the hungry wanderers in these dreary regions. When a group of wolves and a flight of crows were discovered, the travellers knew that there was a carcass to be divided; and they sometimes succeeded in obtaining a share of the prey, if it had been recently killed. Even the wolves have a fear of man.

Anecdote.—Dr. Richardson, having the first watch, had gone to the summit of the hill, and remained seated, contemplating the river that washed the precipice under his feet, long after dusk had hid distant objects from his view. His thoughts were, perhaps, far distant from the surrounding scenery, when he was roused by an indistinct noise behind him; and, on looking round, perceived that nine wolves had ranged themselves in the form of a crescent, and were advancing, apparently with the intention of driving him into the river On his rising up, they halted; and when he advanced, they made way for his passage down to the tents. The formation of a crescent is the mode generally adopted by a pack of wolves to prevent the escape of any animal which they chase.

Cunning of Wolves.—The following passage from the same work shows the extreme cunning of wolves in the pursuit of a creature of superior speed.—

"So much snow had fallen on the night of the 24th, that the track we intended to follow was completely covered; and our march to-day was very fatiguing. We passed the remains of two red deer, lying at the bases of perpendicular cliffs, from the summits of which they had probably been forced by the wolves. These voracious animals, who are inferior in speed to the moose or red deer, are said frequently to have recourse to this expedient, in places where extensive plains are bounded by precipitous cliffs. Whilst the deer are quietly grazing, the wolves assemble in great numbers, and forming a crescent, creep slowly towards the herd, so as not to alarm them much at first; but when they perceive that they have fairly hemmed in the unsuspecting creatures, and cut off their retreat across the plain, they move more quickly, and with hideous yells terrify their prey, and urge them to flight by the only open way, which is towards the precipice; appearing to know that, when the herd is once at full speed, it is easily driven over the cliff, the rearmost urging on those that are before. The wolves then descend at leisure, and feast on the mangled carcasses."—Franklin.

the ground, and runs with it much swifter than the shepherds who pursue him; so that nothing but the dogs can overtake and oblige him to quit his prey. He bites cruelly, and always with greater vehemence in proportion as he is least resisted; for he uses precautions with such animals as attempt to stand upon the defensive. He is ever cowardly, and never fights but when under a necessity of satisfying hunger, or making good his retreat. When he is wounded by a bullet, he is heard to cry out; and yet, when surrounded by the peasants, and attacked with clubs, he never howls as the dog under correction, but defends himself in silence, and dies as hard as he lived.*

The wolf smells a carcass at more than a league's distance; he also perceives living animals a great way off, and follows them a long time upon the scent. Whenever he leaves the wood, he always takes care to go out against the wind. When just come to its extremity, he stops to examine, by his smell, on all sides, the emanations that may come either from his enemy or his prey, which he very nicely distinguishes. He prefers those animals which he kills himself to those he finds dead; and yet he does not disdain these when no better is to be had. He is particularly fond of human flesh; and perhaps, if he were sufficiently powerful, he would eat no other. Wolves have been seen following armies, and arriving in numbers upon the field of battle, where they devoured such dead bodies as were left upon the field, or but negligently interred. These, when once accustomed to human flesh, ever after seek particularly to attack mankind, and choose to fall upon the shepherd rather than his flock. We have had a late instance of two or three of these keeping a whole province, for more than a month, in a continual alarm.

It sometimes happens that a whole country is called out to extirpate these most dangerous invaders. The hunting the wolf is a favourite diversion among the great of some countries; and it must be confessed it seems to be the most useful of any.

The wolf is sometimes hunted with harriers; but as he always goes straight forward, and often holds his speed for a whole day together, this kind of chase is tedious and disagreeable, at least if the harriers are not assisted by greyhounds, who may harass him at every view. Several other arts have been also used to take and destroy this noxious animal. He is surrounded and wounded by men and large house-dogs; he is secured in traps; he is poisoned by carcasses prepared and placed for that purpose, and is caught in pit falls. "Gesner tells us of a friar, a woman, and a wolf, being taken in one of these, all in the same night. The woman lost her senses with the fright, the friar his reputation, and the wolf his life." All these disasters, however, do not prevent this animal's multiplying in great numbers, particularly in countries where the woods are plenty. France, Spain, and Italy are greatly infested with them; but England, Ireland, and Scotland are happily set free.†

King Edgar is said to be the first who attempted to rid this kingdom of such disagreeable inmates, by commuting the punishment for certain crimes into the

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* **Wolf Chase.**—Lord Byron's description of a chase by wolves is so graphic, that no apology is requisite for its insertion here.

We rustled through the leaves like wind,
Left shrubs and trees and wolves behind;
By night I heard them on the track,
Their troop came hard upon our back,
With their long gallop, which can tire
The hound's deep note, the hunter's fire:
Where'er we flew they followed on,
Nor left us with the morning sun;
Behind I saw them scarce a rood,
At day-break winding through the wood;
And through the night had heard their feet
Their stealing, rustling step repeat.—Mazeppa.

† **Destruction of Live Stock by Wolves in Russia.**—In the government of Livonia alone, the following animals were destroyed by wolves in 1823. The account is an official one.

Horses	1,841
Fowls	1,243
Horned Cattle	1,807
Calves	733
Sheep	15,182
Lambs	726
Goats	2,545
Kids	183
Swine	4,190
Sucking Pigs	312
Dogs	703
Geese	673

Arcana of Science, 1831.

acceptance of a number of wolves' tongues from each criminal. (*g*) However, some centuries after, these animals were again increased to such a degree, as to become the object of royal attention; accordingly, Edward the First issued out his mandate to one Peter Corbet to superintend and assist in the destruction of them. They are said to have infested Ireland long after they were extirpated in England; however, the oldest men in that country remember nothing of these animals; and it is probable that there have been none there for more than a century past. Scotland also is totally free.

The colour of this animal differs according to the different climates where it is bred, and often changes even in the same country. Beside the common wolves which are found in France and Germany, there are others with thicker hair, inclining to yellow. These are more savage and less noxious than the former, neither approaching the flocks nor habitations, and living rather by the chase than rapine. In the northern climates they are found some quite black, and some white all over. The former are larger and stronger than those of [illegible] other kinds.

The species is very much diffused in every part of the world, being found in Asia, Africa, and in America, as well as Europe. The wolves of Senegal resemble those of France, except that they are larger and much fiercer than those of Europe. Those of Egypt are smaller than those of Greece. In the East the wolf is trained up for a show, being taught to dance and play tricks; and one of these thus educated often sells for four or five hundred crowns. "It is said that in Lapland the wolf will never attack a rein-deer that is seen haltered, for this wary animal, being well acquainted with the nature of a trap, suspects one wherever it perceives a rope. However, when he sees the deer entirely at liberty, he seldom fails to destroy it.

"The wolf of North America is blacker and much less than those in other parts of the world, and approaches nearer in form to the dog than those of the ordinary kind. (*g*) In fact, they were made use of as such by the savages, till the Europeans introduced others; and even now, on the remoter shores, or the more inland parts of the country, the savages still make use of these animals in hunting.* They are very tame and gentle; and those of this kind that are wild are neither so large nor so fierce as a European wolf, nor do they ever attack mankind. They go together in large packs by night to hunt the deer, which they do as well as any dogs in England; and it is confidently asserted that one of them is sufficient to run down a deer. (*g*) Whenever they are seen along the banks of those rivers near which the wandering natives pitch their huts, it is taken for granted that the bison or the deer are not far off; and the savages affirm that the wolves come with the tidings, in order to have the garbage, after the animal has been killed by the hunters. Catesby adds a circumstance relative to these animals, which, if true, invalidates many of Mr. Buffon's observations in the foregoing history. He asserts, that these being the only dogs used by the Americans, before the arrival of the Europeans among them, they have since engendered together, and that their breed has become prolific; which proves the dog and the wolf to be of the same species. It were to be wished that this fact were better ascertained; we should then know to a certainty in what degree the dog and wolf resemble each other, as well in nature as in conformation; we might then, perhaps, be enabled to improve the breed of our dogs, by bringing them back to their native forms and instincts; we might, by crossing the strain, restore that race of those bold animals, which the ancients assure us were more than a match for the lion."

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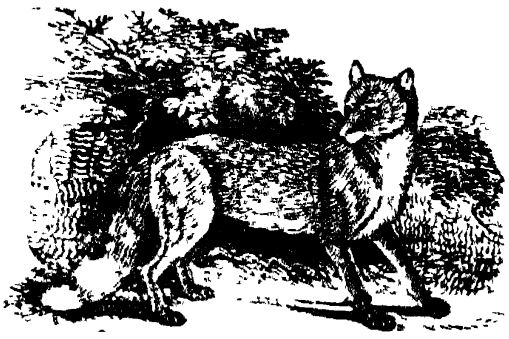
* WOLVES OF HUDSON'S BAY.—Mr. Macnab informs us, that in Hudson's Bay there are three varieties of the species, distinguished by the size of their skins, and the colour of the fur. In two kinds the colours of the felt are alike; the greatest number are grey, interspersed with black hairs, particularly about the upper part of the hind-legs; a few of both sizes are found black, and some of a dingy white; the largest are always in woody regions, seldom seen in numbers together; seven is the greatest assemblage ever seen at one time. The small sized are found in the plains and boundless prairies where the buffaloes resort; there they are numerous, and are often seen in dozens, annoying and feeding on these animals. These never change to a white colour in winter. The third are of a beautiful white, like the arctic fox, the fur being much longer, thicker, and more valuable; they are never found but in sterile and desert regions, where the solitary Esquimaux ranges the dreary waste.

(*g*) British Zoology, p. 62.

(*g*) Brookes's Natural History, vol. i. p. 198.

(*g*) Dictionaire Raisonée. Loup.

However this animal may be useful in North America, the wolf of Europe is a very noxious animal, and scarce any thing belonging to him is good, except his skin. Of this the furriers make a covering that is warm and durable, though coarse and unsightly. His flesh is very indifferent, and seems to be disliked by all other animals, no other creature being known to eat the wolf's flesh, except the wolf himself. He breathes a most fœtid vapour from his jaws, as his food is indiscriminate, often putrid, and seldom cleanly. In short, every way offensive, a savage aspect, a frightful howl, an insupportable odour, a perverse disposition, fierce habits, he is hateful while living, and useless when dead.*


(European Fox.)

THE FOX.—The fox very exactly resembles the wolf and the dog internally, and, although he differs greatly from both in size and carriage, yet when we come to examine his shapes minutely, there will appear to be very little difference in the description. Were, for instance, a painter to draw from a natural historian's exactest description the figure of a dog, a wolf, and a fox, without having ever seen either, he would be very apt to confound all these animals together, or rather he would be unable to catch those peculiar outlines that no description can supply.

The fox is of a slenderer make than the wolf, and not near so large: for as the former is above three feet and a half long, so the other is not above two feet three inches. The tail of the fox also is longer in proportion, and more bushy; its nose is smaller, and approaching more nearly to that of the grey hound, and its hair softer. On the other hand, it differs from the dog in having its eyes obliquely situated, like those of the wolf; its ears are directed also in the same manner as those of the wolf, and its head is equally large in proportion to its size. It differs still more from the dog in its strong, offensive smell, which is peculiar to the species, and often the cause of their death. However, some are ignorantly of opinion that it will keep off infectious diseases, and they preserve this animal near their habitations for that very purpose.

The fox has since the beginning been famous for his cunning and his arts, and he partly merits his reputation (g). Without attempting to oppose either the dogs or the shepherds, without attacking the flock, or alarming the village, he finds an easier way to subsist, and gains by his address what is denied to his strength or courage. Patient and prudent, he waits the opportunity of depredation, and varies his conduct with every occasion. His whole study is his preservation; although nearly as indefatigable, and actually more swift than the wolf, he does not entirely trust to either, but makes himself an asylum, to which he retires in case of necessity, where he shelters himself from danger, and brings up his young.

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* MADNESS.—The wolf is sometimes affected with madness, in symptoms and consequences exactly similar to that which affects the dog. This disease, as it happens to them in the depth of winter, cannot be attributed to the great heat of the dog days. In the northern parts of the world, they frequently in the spring get upon the fields of ice adjoining the sea, for the purpose of preying upon young seals, which they there find asleep; but vast pieces of the ice occasionally detaching itself from the mass, they are carried with it to a great distance from the land, where they perish, amidst the most hideous and dreadful howlings.

(g) Buffon, Renard.

As among men, those who lead a domestic life are more civilized, and more endued with wisdom, than those who wander from place to place, so, in the inferior ranks of animated nature, the taking possession of a home supposes a degree of instinct which others are without.(g) The choice of the situation for this domicile, the art of making it convenient, of hiding its entrance, and securing it against more powerful animals, are all so many marks of superior skill and industry. The fox is furnished with both, and turns them to his advantage. He generally keeps his kennel at the edge of the wood, and yet within an easy journey of some neighbouring cottage. From thence he listens to the crowing of the cock, and the cackling of the domestic fowls. He scents them at a distance; he seizes his opportunity, conceals his approaches, creeps slyly along, makes the attack, and seldom returns without his booty. If he be able to get into the yard, he begins by levelling all the poultry without remorse, and carrying off part of the spoil, hides it at some convenient distance, and again returns to the charge. Taking off another fowl in the same manner, he hides that also, but not in the same place; and this he practises for several times together, until the approach of day, or the noise of the domestics, give him warning to retire. The same arts are practised when he finds birds entangled in springes laid for them by the fowler; the fox takes care to be beforehand, very expertly takes the bird out of the snare, hides it for three or four days, and knows very exactly when and where to return to avail himself of the hidden treasure. He is equally alert in seizing the young hares and rabbits, before they have strength enough to escape him; and when the old ones are wounded and fatigued, he is sure to come upon them in their moments of distress, and to show them no mercy. In the same manner he finds out birds' nests, seizes the partridge and the quail while sitting, and destroys a large quantity of game. The wolf is most hurtful to the peasant, but the fox to the gentleman. In short, nothing that can be eaten seems to come amiss; rats, mice, serpents toads, and lizards. He will, when urged by hunger, eat vegetables and insects; and those that live near the sea-coasts will, for want of other food, eat crabs, shrimps, and shell-fish. The hedge-hog in vain rolls itself up into a ball to oppose him; this determined glutton teases it until it is obliged to appear uncovered, and then he devours it. The wasp and the wild bee are attacked with equal success. Although at first they fly out upon their invader, and actually oblige him to retire, this is but for a few minutes, until he has rolled himself upon the ground, and thus crushed such as stick to his skin; he then returns to the charge, and at last, by perseverance, obliges them to abandon their combs, which he greedily devours, both wax and honey.

The chase of the fox requires less preparation than that of the wolf, and it is also more pleasant and amusing. He is usually pursued by a large kind of harrier or hound, assisted by terriers, or a smaller breed, that follow him into his kennel, and attack him there. The instant he perceives himself pursued, he makes to his kennel, and takes refuge at the bottom of it, where for awhile he loses the cry of his enemies; but the whole pack coming to the mouth, redouble their vehemence and rage, and the little terrier boldly ventures in. It often happens that the kennel is made under a rock, or among the roots of old trees; and in such cases the fox cannot be dug out, nor is the terrier able to contend with him at the bottom of his hole. By this contrivance he continues secure; but when he can be dug out, the usual way is to carry him in a bag to some open country, and there set him loose before the hounds. The hounds and the men follow, barking and shouting wherever he runs; and the body being strongly employed, the mind has not time to make any reflection on the futility of the pursuit. What adds to this entertainment is the strong scent which the fox leaves, that always keeps up a full cry; although as his scent is stronger than that of the hare, it is much sooner evaporated. His shifts to escape when all retreat is cut off to his kennel are various and surprising. He always chooses the most woody country, and takes those paths that are most embarrassed with thorns and briars. He does not double, nor use the unavailing shifts of the hare; but flies in a direct line before the hounds, though at no very great distance; manages his strength; takes to the low and plashy grounds, where the scent will be less apt to lie; and at last, when overtaken, he defends himself with desperate obstinacy, and fights in silence to the very last gasp.*

(g) Buffon, Rénard.

The fox, though resembling the dog in many respects, is nevertheless very distinct in his nature, refusing to engender with it; and though not testifying the antipathy of the wolf, yet discovering nothing more than indifference. This animal also brings forth fewer at a time than the dog, and that but once a year. Its litter is generally from four to six, and seldom less than three. The female goes with young about six weeks, and seldom stirs out while pregnant, but makes a bed for her young, and takes every precaution to prepare for their production. When she finds the place of their retreat discovered, and that her young have been disturbed during her absence, she removes them one after the other in her mouth, and endeavours to find them out a place of better security. A remarkable instance of this animal's parental affection happened while I was writing this history, in the county of Essex. A she-fox that had, as it should seem, but one cub, was unkennelled by a gentleman's hounds, near Chelmsford, and hotly pursued. In such a case, when her own life was in imminent peril, one would think it was not a time to consult the safety of her young; however, the poor animal, braving every danger, rather than leave her cub behind to be worried by the dogs, took it up in her mouth, and ran with it in this manner for some miles. At last, taking her way through a farmer's yard, she was assaulted by a mastiff, and at last obliged to drop her cub, which was taken up by the farmer. I was not displeased to hear that this faithful creature escaped the pursuit, and at last got off in safety. The cubs of the fox are born blind, like those of the dog; they are eighteen months or two years in coming to perfection, and live about twelve or fourteen years.

As the fox makes war upon all animals, so all others seem to make war upon him. The dog hunts him with peculiar acrimony; the wolf is still a greater and more necessitous enemy, who pursues him to his very retreat. Some pretend to say that, to keep the wolf away, the fox lays at the mouth of its kennel a certain herb, to which the wolf has a particular aversion. This, which no doubt is a fable, at least shows that these two animals are as much enemies to each other as to all the rest of animated nature. But the fox is not hunted by quadrupeds alone; for the birds, who know him for their mortal enemy, attend him in his excursions, and give each other warning of their approaching danger. The daw, the magpie, and the black-bird conduct him along, perching on the hedges as he creeps below, and, with their cries and notes of hostility, apprize all other animals to beware: a caution which they perfectly understand, and put into practice. The hunters themselves are often informed by the birds of the place of his retreat, and set the dogs into those thickets where they see them particularly noisy and querulous. So that it is the fate of this petty plunderer to be detested by every rank of animals; all the weaker classes shun, and all the stronger pursue him.

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* FOX-HUNTING IN ENGLAND.—Fox-hunting has been long a fashionable field diversion. Hunting fox or hare, was scarce ever so vigorously pursued as at the present period, and there are consequently an immense number of packs in England. The greater part of the country is admirably calculated for this species of sport, the midland counties in particular. A great portion of the mountainous parts of the northern counties is not calculated for fox-hunting in the regular way: but as they make considerable havock among the sheep, the shepherds destroy them as opportunities offer. There are many establishments for fox hunting in Ireland; and in the Lowlands of Scotland kennels of fox-hounds are to be met with; but much of the Lowlands is ill-adapted for the diversion, while the Highlands are altogether out of the question, except in the manner adopted by the inhabitants. Throughout the Highlands, foxes are to be found in greater numbers than is consistent with the safety of the sheep flocks. The Highlanders, whenever they discover the retreat of the wily reynard, in an accessible situation, immediately assail him; he is driven from his hole by a terrier, and, if possible, worried on the spot by a stout, rough greyhound, assisted, perhaps, by several curs.—Ed.

The pleasure of the pursuit is well set forth in the spirit-stirring song, "The Dawn of Day," by Robert Bloomfield, the Farmer's Boy. Many a morning does these strains ring over the lea, and "crack the welkin."

The grey eye of morning was dear to my youth,
When I sprang like the roe from my bed,
With the glow of the passions, the feelings of truth,
And the light hand of Time on my head.

For then 'twas my maxim through life to be free,
And to sport my short moments away:
The cry of the hounds was music for me,
My glory—the dawn of the day.

In yellow-leaved autumn, the haze of the morn
Gave promise of rapture to come;
The melody woke in the sound of the horn,
As we cheer'd the old fox from his home;

The breeze and the shout met the sun's early beam,
With the village response in full play:
All vigour, my steed leapt the fence or the stream,
And was foremost at dawn of the day.

The well-timed halloo that shook the green wood,
And arrested the ploughman's gay song,
Gave nerve to the hunters, and fire to the blood
Of the hounds as they bounded along.

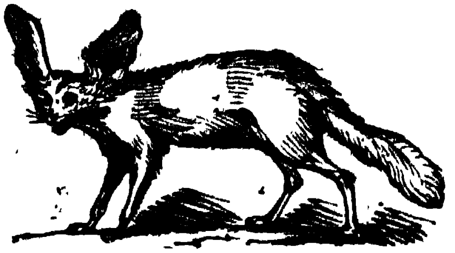
And shall I relinquish the joy of my heart,
While years with my strength roll away?
Hark! the horn—bring my horse—see, they're ready
to start;
Tallyho! at the dawning of day.

(Grey Fox.)

The fox, of all wild animals, is most subject to the influence of climate; and there are found as many varieties in this kind almost as in any of the domestic animals.(g) The generality of foxes, as is well known, are red; but there are some, though not in England, of a greyish cast; and Buffon asserts that the tip of the tail in all foxes is white; which, however, is not so in those of this country.

(Silver Fox.)

In the colder countries round the pole, the foxes are of all colours: black, blue, grey, iron-grey, silver-grey, white, white with red legs, white with black heads, white with the tip of the tail black, red with the throat and belly entirely white, and lastly with a stripe of black running along the back, and another crossing it at the shoulders.(g) The common kind, however, is more universally diffused than any of the former, being found in Europe, in the temperate climates of Asia, and also in America; they are very rare in Africa, and in the countries lying under the torrid zone.*



(The Fennecus Cerdo.)

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* The Fennecus Cerdo.—This beautiful and extraordinary animal, or at least one of its genus, was first made known to European naturalists by Bruce, who received it from his dragoman, whilst consul general at Algiers. It is frequently met with in the date territories of Africa, where the animals are hunted for their skins, which are afterwards sold at Mecca, and then exported to India. Bruce kept his animal alive for several months, and took a drawing of it in water colours, of the natural size, a copy of which,

(g) Buffon, Rénard

(g) Ibid.

THE JACKAL.—The jackal is one of the commonest wild animals in the East; and yet there is scarce any less known in Europe, or more confusedly described by natural historians. In general we are assured that it resembles the fox in figure and disposition, but we are still ignorant of those nice distinctions by which it is known to be of a different species.

(Jackal.)

The species of the jackal is diffused all over Asia, and is found also in most parts of Africa, seeming to take up the place of the wolf, which in those countries is not so common. There seems to be many varieties among them; those of the warmest climates appear to be the largest, and their colour is rather of a reddish brown than of that beautiful yellow by which the smaller jackals are chiefly distinguished.

Although the species of the wolf approaches very near to that of the dog, yet the jackal seems to be placed between them; to the savage fierceness of the wolf it adds the impudent familiarity of the dog.(*g*) Its cry is a howl, mixed with barking, and a lamentation resembling that of human distress. It is more noisy in its pursuits even than the dog, and more voracious than the wolf. The jackal never goes alone, but always in a pack of forty or fifty together. These unite regularly every day, to form a combination against the rest of the forest. Nothing then can escape them; they are content to take up with the smallest animals: and yet, when thus united, they have courage to face the largest. They seem very little afraid of mankind; but pursue their game to the very doors, without testifying either attachment or apprehension. They enter insolently into the sheep-folds, the yards, and the stables, and, when they can find nothing else, devour the leather harness, boots, and shoes, and run off with what they had not time to swallow.

They not only attack the living but the dead. They scratch up with their feet the new-made graves, and devour the corpse how putrid soever. In those countries therefore, where they abound, they are obliged to beat the earth over

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on transparent paper, was clandestinely made by his servant. Mr. Brander, into whose hands the *Fennecus* fell after Bruce left Algiers, gave an account of it in "Some Swedish Transactions," but refused to let the figure be published, the drawing having been unfairly obtained. Bruce asserts that this animal is described in many Arabian books, under the name of *El Fennec*, which appellation he conceives to be derived from the Greek word for a palm or date-tree.

The favourite food of Bruce's Fennec was dates or any sweet fruit; but it was also very fond of eggs; when hungry it would eat bread, especially with honey or sugar. His attention was immediately attracted if a bird flew near him, and he would watch it with an eagerness that could hardly be diverted from its object; but he was dreadfully afraid of a cat. Bruce never heard that he had any voice. During the day he was inclined to sleep, but became restless and exceedingly unquiet as night came on. The above Fennec was about ten inches long, the tail five inches and a quarter, near an inch of it on the tip, black The colour of the body was dirty white, bordering on cream colour; the hair on the belly rather whiter, softer, and longer than on the rest of the body. His look was sly and wily; he built his nest on trees, and did not burrow in the earth.

Naturalists, especially those of France, were long induced to suspect the truth of Bruce's description of this animal; but a specimen from the interior of Nubia, and preserved in the museum at Franckfort, has recently been engraved; and thus the matter is nearly settled by the animal belonging to the genus *Canis*, and the sub-genus *Vulpes*; the number of teeth and form, being precisely the same as the fox, which it also resembles in its feet, number of toes, and form of tail.—MIRROR, VOL. X.

(*g*) Buffon, vol xxvii p 52.

the grave, and to mix it with thorns, to prevent the jackals from scraping it away. They always assist each other as well in this employment of exhumation, as in that of the chase. While they are at this dreary work, they exhort each other by a most mournful cry, resembling that of children under chastisement; and when they have thus dug up the body, they share it amicably between them. These, like all other savage animals, when they have once tasted of human flesh, can never after refrain from pursuing mankind. They watch the burying-grounds, follow armies, and keep in the rear of caravans. They may be considered as the vulture of the quadruped kind; every thing that once had animal life, seems equally agreeable to them; the most putrid substances are greedily devoured; dried leather, and anything that has been rubbed with grease, how insipid soever in itself, is sufficient to make the whole go down.

They hide themselves in holes by day, and seldom appear abroad till nightfall, when the jackal that has first hit upon the scent of some larger beast gives notice to the rest by a howl, which it repeats as it runs; while all the rest, that are within hearing, pack in to its assistance.

The lion, the tiger, and the panther, whose appetites are superior to their swiftness, attend to the call of the jackal, and follow in silence at some distance behind.(*g*) The jackal pursues the whole night with unceasing assiduity, keeping up the cry, and with great perseverance at last tires down its prey; but just at the moment it supposes itself going to share the fruits of its labour, the lion or the leopard comes in, satiates himself upon the spoil, and his poor provider must be content with the bare carcass he leaves behind.[*] It is not to be wondered at, therefore, if the jackal be voracious, since it so seldom has a sufficiency; nor that it feeds on putrid substances, since it is not permitted to feast on what it has newly killed. Beside these enemies, the jackal has still another to cope with, for between him and the dog there is an irreconcileable antipathy, and they never part without an engagement. The Indian peasants often chase them as we do foxes; and have learned, by experience, when they have got a lion or a tiger in their rear. Upon such occasions they keep their dogs close, as they would be no match for such formidable animals, and endeavour to put them to flight with their cries. When the lion is dismissed, they more easily cope with the jackal, who is as stupid as it is impudent, and seems much better fitted for pursuing than retreating. It sometimes happens that one of them steals silently into an out-house, to seize the poultry, or devour the furniture, but hearing others in full cry at a distance, without thought, it instantly answers the call, and thus betrays its own depredations. The peasants sally out upon it, and the foolish animal finds, too late, that its instinct was too powerful for its safety.

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[*] THE JACKAL, THE LION'S PROVIDER.—This animal has been popularly called the lion's provider. The common notion that he is in confederacy with the lion, as above shown to be, is an erroneous one. At the cry of the jackal, echoed as it is by hundreds of similar voices through the woods and arid plains, the lion, whose ear is dull, rouses himself into action. He knows that some unhappy wanderer from the herds has crossed the path of the jackal, and he joins in the pursuit. Of this nocturnal cry we have the most fearful accounts. "The chacal's shriek," has been often described as more terrific than the howl of the hyæna, or the roar of the tiger; and it probably is most alarming, from its singular dreariness amidst the lonely regions in which it is heard. Captain Beechy describes it well, in his account of the Expedition to explore the Northern Coasts of Africa. "The cry of the jackal, has something in it rather appalling, when heard for the first time at night; and as they usually come in packs, the first shriek which is uttered, is always the signal for a general chorus. We hardly know a sound which partakes less of harmony; and indeed, the sudden burst of the answering, long-protracted scream, succeeding immediately to the opening note, is scarcely less impressive than the roll of the thunder-clap immediately after a flash of lightning. The effect of this music is very much increased, when the first note is heard in the distance, and the answering yell bursts out from several points at once, within a few yards, or feet, of the place where the auditors are sleeping."

(*g*) Linnæi Systema, p. 60.

THE ISATIS.—As the jackal is a sort of intermediate species between the dog and the wolf;(g) so the isatis may be considered as placed between the dog and the fox. This animal has hitherto been supposed to be only a variety of the latter; but from the latest observations, there is no doubt of their being perfectly distinct. The isatis is very common in all the northern countries bordering upon the Icy sea; and is seldom found, except in the coldest countries. It extremely resembles a fox, in the form of its body and the length of its tail: and a dog, in the make of its head and the position of its eyes. The hair of these animals is softer than that of a common fox; some are blue, some are white at one season, and at another of a russet brown. Although the whole of its hair be two inches long, thick, tufted and glossy, yet the under jaw is entirely without any, and the skin appears bare in that part.

(Isatis.)

This animal can bear only the coldest climates, and is chiefly seen along the coasts of the Icy sea, and upon the banks of the great rivers that discharge themselves therein. It is chiefly fond of living in the open country, and seldom seen in the forest, being mostly found in the mountainous and naked regions of Norway, Siberia, and Lapland. It burrows, like the fox; and when with young, the female retires to her kennel, in the same manner as the fox is seen to do. These holes, which are very narrow, and extremely deep, have many outlets. They are kept very clean, and are bedded at the bottom with moss, for the animal to be more at its ease. Its manner of coupling, time of gestation, and number of young, are all similar to what is found in the fox; and it usually brings forth at the end of May, or the beginning of June.

Such are the particulars in which this animal differs from those of the dog kind, and in which it resembles them: but its most striking peculiarity remains still to be mentioned; namely, its changing its colour, and being seen at one time brown, and at another perfectly white. As was already said, some are naturally blue, and their colour never changes; but such as are to be white, are, when brought forth, of a yellow hue, which, in the beginning of September, is changed to white, all except along the top of the back, along which runs a stripe of brown, and another crossing it down the shoulders, at which time the animal is called the *crost fox;* however, this brown cross totally disappears before winter, and then the creature is all over white, and its fur is two inches long: this, about the beginning of May, again begins to fall; and the molting is completed about the middle of July, when the isatis becomes brown once more. The fur of this animal is of no value, unless it be killed in winter.

THE HYÆNA.—The hyæna is the last animal I shall mention among those of the dog kind, which it in many respects resembles, although too strongly marked to be strictly reduced to any type. The hyæna is nearly of the size of a wolf; and has some similitude to that animal in the shape of its head and body. The head, at first sight, does not appear to differ, except that the ears of the hyæna are longer, and more without hair; but, upon observing more closely, we shall find the head broader, the nose flatter, and not so pointed. The eyes are not placed obliquely, but more like those of a dog. The legs, particularly the hinder, are longer than those either of the dog or the wolf, and different from all other quadrupeds, in having but four toes, as well on the fore-feet as on the

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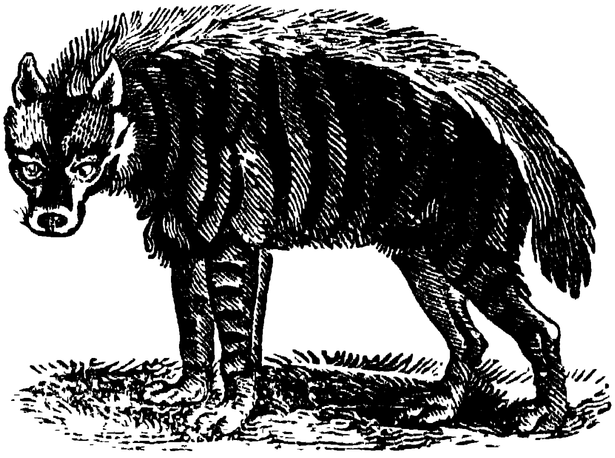
(g) In this description I have followed Mr. Buffon.



(Striped Hyæna.

hinder. Its hair is of a dirty greyish colour, marked with black, disposed in waves down its body. Its tail is short, with pretty long hair; and immediately under it, above the anus, there is an opening into a kind of glandular pouch, which separates a substance of the consistence but not of the odour of civet. This opening might have given rise to the error of the ancients, who asserted, that this animal was every year, alternately, male and female. Such are the most striking distinctions of the hyæna, as given us by naturalists; which, nevertheless, convey but a very confused idea of the peculiarity of its form. Its manner of holding the head seems remarkable somewhat like a dog, pursuing the scent, with the nose near the ground. The head being held thus low, the back appears elevated, like that of the hog, which, with a long bristly band of hair that runs all along, gives it a good deal the air of that animal; and, it is probable that, from this similitude, it first took its name, the word *huoina* being Greek, and derived from *hus*, which signifies a sow.

But no words can give an adequate idea of this animal's figure, deformity, and fierceness. More savage and untameable than any other quadruped, it seems to be for ever in a state of rage or rapacity, for ever growling, except when receiving its food. Its eyes then glisten, the bristles of its back all stand upright, its head hangs low, and yet its teeth appear; all which give it a most frightful aspect, which a dreadful howl tends to heighten. This, which I have often heard, is very peculiar: its beginning resembles the voice of a man moaning, and its latter part as if he were making a violent effort to vomit. As it is loud and frequent, it might, perhaps, have been sometimes mistaken for that of a human voice in distress, and have given rise to the accounts of the ancients, who tell us, that the hyæna makes its moan, to attract unwary travellers, and then to destroy them: however this be, it seems the most untractable, and, for its size, the most terrible of all other quadrupeds; nor does its courage fall short of its ferocity; it defends itself against the lion, is a match for the panther, attacks the ounce, and seldom fails to conquer.*

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* Habits of the Hyæna.—The peculiar powers of the hyæna, arising out of the extraordinary strength of the jaws and teeth, admirably fit him for the purposes which he serves in the economy of nature. An inhabitant of warm countries, he principally derives his subsistence, in common with the jackal and the vulture, from those animal remains, which if unconsumed, would produce the most serious inconvenience. Mr. Pringle observes: "There are several species of vulture in South Africa, but the most common is the large light-coloured *vultur percnopterus*, one of the sacred birds of the ancient Egyptians. These fowls divide with the hyænas the office of carrion scavengers; and the promptitude with which they discover and devour every dead carcass, is truly surprising. They also instinctively follow any band of hunters, or party of men travelling, especially in solitary places, wheeling in circles high in the air, ready to pounce down upon any game that may be shot, and not instantly secured. I have seen a large ox so dexterously handled by a flock of these voracious fowls, that in the course of three or four hours not a morsel, except the bones and skin, which they had contrived to disincarnate almost entire, remained for the hyænas. In a field of battle in South Africa, no one ever buries the dead; the birds and beasts of prey relieve the living of that trouble. Even the bones, except a few of the most unmanageable parts, finds a sepulchre in the voracious maw of the hyæna."—Ephemerides—*note*.

Character of the Hyæna.—The voracity of this animal, its preference of the flesh of living carcasses to living prey, and its consequent propensity to disinter the dead, have bestowed upon it a character for ferocity not

It is an obscure and solitary animal, to be found chiefly in the most desolate and uncultivated parts of the torrid zone, of which it is a native.(*g*) It resides in the caverns of mountains, in the clefts of rocks, or in dens that it has formed for itself under the earth. Though taken never so young, it cannot be tamed;* it lives by depredation, like the wolf, but is much stronger and more courageous. It sometimes attacks man, carries off cattle, follows the flock, breaks open the sheep-cots by night, and ravages with insatiable voracity. Its eyes shine by night; and it is asserted, not without great appearance of truth, that it sees better by night than by day. When destitute of other provision, it scrapes up the graves, and devours the dead bodies, how putrid soever.

Some have said that this animal changes the colour of its hair at will; others, that a stone was found in its eye, which, put under a man's tongue, gave him the gift of prophecy; some have said that he had no joints in the neck, which,

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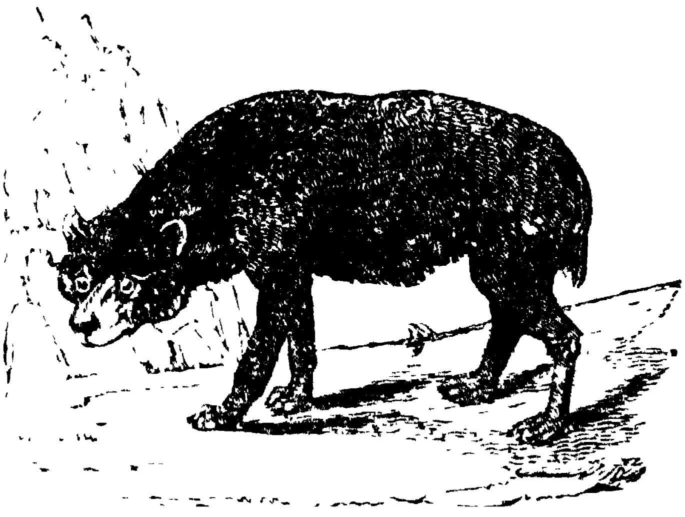
founded in truth. Ill-treatment will render it extremely furious, but under opposite circumstances, it will exhibit the most remarkable degree of mildness and docility. Its cage may be entered with impunity, it will approach to fawn upon those it knows; and were it not for the prejudices of the public on this subject, a hyæna thus tamed, might be intrusted with as much liberty as a common dog.—GRIFFITH.

* THE HYÆNA.—This animal has always been an object of aversion to mankind; and this feeling has been kept up, not only by the showman's stories of "that cruel and untameable animal, that never was yet tamed by man," but by writers on natural history, from Pliny to our own day. That the hyæna can be tamed, and most completely and extensively so, we have proof. "The cadaverous *crocuta*," (the spotted hyæna) says Barrow, in his Travels in Southern Africa, "has lately been *domesticated* in the Sneuberg, where it is now considered one of the best hunters after game, and as faithful and diligent as any of the common sorts of domestic dogs."



(Spotted Hyæna.)

Bishop Heber saw a gentleman in India, Mr. Traill, who had a hyæna for several years, which followed him about like a dog, and fawned on those with whom he was acquainted, and the bishop mentions this as an instance, of "how much the poor hyæna is wronged, when he is described as untameable."

M. F. Cuvier notices an animal of this species that had been taken young at the Cape, and was tamed with difficulty. His keepers had a complete command over his affections. He one day escaped from his cage, and quietly walked into a cottage, where he was retaken without offering any violence. And yet the rage of this animal was very great when any strangers approached it. The fact is, the hyæna is extremely impatient of confinement; and feels a constant irritation at the constraint, which, in the den of a menagerie, is put upon his natural habits. An individual at Exeter 'Change some years ago, was so tame, as to be allowed to walk about the exhibition room He was afterwards sold to a person, who permitted him to go with him into the fields, led with a string. After these indulgences, he became the property of a travelling showman, who kept him constantly in a cage. From that time his ferocity became quite alarming; he would allow no stranger to approach him; and he gradually pined away and died.

This is one, out of the many examples, of the miseries which we inflict upon animals, through an ignorance of their natural habits; and the same ignorance perpetuates delusions, which even men of talent like Goldsmith, have adopted; and which still, in the instance before us, leads many to say, with him, "though taken ever so young, the hyæna cannot be tamed."—ED.

(*g*) Buffon.

however, all quadrupeds are known to have; and some, that the shadow of the hyæna kept dogs from barking. These, among many other absurdities, have been asserted of this quadruped; and which I mention to show the natural disposition of mankind, to load those that are already but too guilty, with accumulated reproach.*

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* Hyæna in Antediluvian England.—A most interesting discovery has been made of the fossil remains of an extinct species of hyæna, and some other antediluvian animals, in the extensive quarries of Boughton, three miles south of Maidstone. These quarries appear to have been worked for many centuries, and there is a tradition that many of the materials of Westminster Abbey and other ancient buildings in London, were brought from hence. The stone from these quarries is commonly designated Kentish Rag: it consists of a succession of beds of limestone and coarse flint dispersed in irregular thickness through a matrix of sand and sandstone; its geological position is in the lowest region of the green-sand formation immediately above the weald clay. The remains in question consist of the jaws, teeth, and broken portions of the skull, together with the bones of the fore and hind legs of a very large hyæna, and a few other teeth and bones apparently of the ox sort. All these were found nearly together, within the space of a few feet, in one of the numerous cracks or fissures, locally called *vents*, that intersect the strata at this place, and are usually from 1 to 20 feet broad: these fissures or vents cut through the strata from the bottom of the quarries to the surface, and are filled with diluvial loam, interspersed with fragments of the adjacent rocks and numerous chalk flints; these last must have been drifted hither from some distant hills, and have fallen into the fissures at the same time with the loam. The bones were discovered at about 15 feet deep in one of these fissures; and from the manner in which they were scattered amongst the loam and stony fragments, they appear to have been drifted to their present place at the same time with the diluvian matter amongst which they lay. The workmen of the quarry say they have frequently found bones there, but neglected to preserve them: enough, however, has already been done to show that the hyæna was among the antediluvian inhabitants of Kent, as it has been proved to have been among those of Yorkshire and Devon. Specimens of these remains may be seen in the Museum of the Geological Society of London.—Arcana of Science, 1828.

CHAP. XIII.

ANIMALS OF THE WEASEL KIND.

HAVING described the bolder ranks of carnivorous animals, we now come to a minuter and more feeble class, less formidable indeed, than any of the former, but far more numerous, and, in proportion to their size, more active and enterprising. The weasel kind may be particularly distinguished from other carnivorous animals, by the length and slenderness of their bodies, which are so fitted, as to wind, like worms, into very small openings, after their prey; and hence also they have received the name of vermin, from their similitude to the worm in this particular. These animals differ from all of the cat kind, in the formation and disposition of their claws, which, as in the dog kinds, they can neither draw in nor extend at pleasure, as cats are known to do. They differ from the dog kind, in being cloathed rather with fur than hair; and although some varieties of the fox may resemble them in this particular, yet the coat of the latter is longer, stronger, and always more resembling hair. Beside these distinctions, all animals of the weasel kind have glands placed near the anus, that either open into, or beneath it, furnishing a substance, that, in some, has the most offensive smell in nature, in others, the most pleasing perfume. All of this kind are still more marked by their habitudes and dispositions, than their external form; cruel, voracious, and cowardly, they subsist only by theft, and find their chief protection in their minuteness. They are all, from the shortness of their legs, slow in pursuit; and, therefore, owe their support to their patience, assiduity, and cunning. As their prey is precarious, they live a long time without food; and if they happen to fall in where it is in plenty, they instantly destroy all about them, before they begin to satisfy their appetite, and suck the blood of every animal, before they begin to touch its flesh.

These are the marks common to this kind, all the species of which have a most striking resemblance to each other; and he that has seen one, in some measure may be said to have seen all. The chief distinction in this numerous class of animals, is to be taken from the size; for no words can give the minute irregularities of that outline, by which one species is to be distinguished from that which is next it. I will begin, therefore, with the least and the best known of this kind, and still marking the size, will proceed gradually to larger and larger, until we come from the weasel to the glutton, which I take to be the largest of all. The weasel will serve as a model for all the rest; and, indeed, the points in which they differ from this little animal, are but very inconsiderable.

THE WEASEL,(*g*) as was said, is the smallest of this numerous tribe; its length not exceeding seven inches, from the tip of the nose to the insertion of the tail. This length, however, seems to be very great, if we compare it with the height of the animal, which is not above an inch and a half. In measuring the wolf, we find him to be not above once and a half as long as he is high: in observing the weasel, we find it near five times as long as it is high, which shows an amazing disproportion. The tail also, which is bushy, is two inches and a half long, and adds to the apparent length of this little animal's body. The colour of the weasel is of a bright red on the back and sides, but white under the throat and the belly. It has whiskers like a cat, and thirty-two teeth, which is two more than any of the cat kind; and these also seem better adapted for tearing and chewing, than those of the cat kind are. The eyes are little and black; the ears short broad,

(Weasel.)

(*g*) British Zoology, vol. i p. 83.

and roundish; and have a fold at the lower part, which makes them look as if they were double. Beneath the corners of the mouth, on each jaw, is a spot of brown.

This animal, though very diminutive to appearance, is nevertheless, a very formidable enemy to quadrupeds a hundred times its own size.[*] It is very common and well known in most parts of this country; but seems held in very different estimation, in different parts of it. In those places where sheep or lambs are bred, the weasel is a most noxious inmate, and every art is used to destroy it; on the contrary, in places where agriculture is chiefly followed, the weasel is considered as a friend that thins the number of such vermin as chiefly live upon corn: however, in all places, it is one of the most untameable and untractable animals in the world.(g) When kept in a cage, either for the purposes of amusement or inspection, it will not touch any part of its victuals while any body looks on. It keeps in a continual agitation, and seems frighted so much at the sight of mankind, that it will die, if not permitted to hide itself from their presence. For this purpose, it must be provided in its cage, with a sufficient quantity of wool or hay, in which it may conceal itself, and where it may carry whatever it has got to eat; which, however, it will not touch until it begins to putrefy. In this state it is seen to pass three parts of the day in sleeping; and reserves the night for its times of exercise and eating.*

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[*] COURAGE OF THE WEASEL.—The following story is told in Selkirkshire:—"A group of haymakers, while busy at their work on Chapelhope meadow, at the upper end of St. Mary's Loch (or rather of the Loch of the Lowes, which is separated from it by a narrow neck of land), saw an eagle rising above the steep mountains that inclose the narrow valley. The eagle himself was, indeed, no unusual sight; but there is something so imposing and majestic in the flight of this noble bird, while he soars upwards in spiral circles, that it fascinates the attention of most people. But the spectators were soon aware of something peculiar in the flight of the bird they were observing. He used his wings violently; and the strokes were often repeated, as if he had been alarmed and hurried by unusual agitation; and they noticed, at the same time, that he wheeled in circles that seemed constantly decreasing, while his ascent was proportionally rapid. The now idle haymakers drew together in close consultation on the singular case, and continued to keep their eyes on the seemingly distressed eagle, until he was nearly out of sight, rising still higher and higher into the air. In a short while, however, they were all convinced that he was again seeking the earth, evidently not as he ascended, in spiral curves; it was like something falling, and with great rapidity. But, as he approached the ground, they clearly saw he was tumbling in his fall like a shot bird; the convulsive fluttering of his powerful wings stopping the descent but very little, until he fell at a small distance from the men and boys of the party, who had naturally run forward, highly excited by the strange occurrence. A large black-tailed weasel or stoat ran from the body as they came near, turned with the usual *nonchalance* and impudence of the tribe, stood up upon its hind legs, crossed its fore-paws over its nose, and surveyed its enemies a moment or two (as they often do when no dogs is near), and bounded into a saugh bush. The king of the air was dead; and, what was more surprising, he was covered with his own blood; and, upon further examination, they found his throat cut, and the stoat has been suspected as the regicide unto this day."

This singular story I always looked upon as too good to be true, until lately a friend mentioned the following fact that came under his own observation:—A light snow covered the ground; and he, having walked out to an adjoining hill to meet with one of his shepherds, fell in with the track of one of these weasels, which is easily to be distinguished from that of the smaller species, by the larger footprint and length of the spring, among the snow. He followed the track for some time, for his amusement, along the side of the hill, until he came to the marks where a pair of grouse had been sitting, when he lost all traces of the weasel, and could follow it no further. As there was no appearance of a hole, he was much surprised, and paying close attention to the track of the animal he came to be convinced that it had sprung upon one of the birds, which had flown away with it. As he is a person of uncommonly acute observation, sound judgment, and strong sense, I have the utmost confidence in the correctness of his judgment regarding this curious circumstance. The conclusion is, that the stoat knew quite well what it was about, and would keep its hold until it came to the ground again, under similar circumstances with the eagle. The matchless agility and comparative strength of this bold little creature, would enable it to save itself during the fall; before which took place, it had probably, as in the former strange instance, destroyed the life of its more harmless prey.—CORRESPONDENCE, MAG. NAT HIST.

(g) Buffon, vol. xv p. 37.

In its wild state, the night is likewise the time during which it may be properly said to live. At the approach of evening, it is seen stealing from its hole, and creeping about the farmer's yard for its prey. If it enters the place where poultry are kept, it never attacks the cocks or the old hens, but immediately aims at the young ones. It does not eat its prey on the place, but, after killing it by a single bite near the head, and with a wound so small that the place can scarcely be perceived, it carries it off to its young, or its retreat. It also breaks and sucks the eggs, and sometimes kills the hen that attempts to defend them. It is remarkably active; and, in a confined place, scarce any animal can escape it. It will run up the sides of walls with such facility, that no place is secure from it; and its body is so small, that there is scarce any hole but what it can wind through. During the summer, its excursions are more extensive; but in winter it chiefly confines itself in barns and farmyards, where it remains till spring, and where it brings forth its young. All this season it makes war upon the rats and mice, with still greater success than the cat; for being more active and slender, it pursues them into their holes, and, after a short resistance, destroys them. It creeps also into pigeon-holes, destroys the young, catches sparrows, and all kind of small birds; and, if it has brought forth its young, hunts

* Taming the Weasel.—The usual method of taming these creatures is, to stroke them gently over the back; and to threaten, and even to beat them, when they attempt to bite. Aldrovandus observes, that their teeth should be rubbed with garlic, which will take away all their inclination to bite.

Account of a tame Weasel.—Instances are not wanting to prove that the weasel may be brought into complete subjection. Madamaiselle de Laistre, in a letter on this subject, gives a very pleasing account of the education and manners of a weasel which she took under her protection, and which frequently ate from her hand, seemingly more delighted with this manner of feeding than any other.

"If I pour," says this lady, "some milk into my hand, it will drink a good deal, but if I do not pay it this compliment it will scarcely take a drop. When satisfied it generally goes to sleep. My chamber is the place of its residence; and I have found a method of dispelling its strong smell by perfumes. By day it sleeps in a quilt, into which it gets by an unsown place which it had discovered on the edge; during the night, it is kept in a wired box or cage, which it always enters with reluctance, and leaves with pleasure. If it be set at liberty before my time of rising, after a thousand little playful tricks, it gets into my bed, and goes on to sleep on my hand or on my bosom. If I am up first, it spends a full half hour in caressing me, playing with my fingers like a little dog, jumping on my head and on my neck, and running round on my arms and body with a lightness and elegance which I never found in any other animal. If I present my hands at the distance of three feet, it jumps into them without ever missing. It shows a great deal of address and cunning in order to compass its ends, and seems to disobey certain prohibitions merely through caprice. During all its actions it seems solicitous to divert, and to be noticed; looking at every jump, and at every turn, to see whether it be observed or not. If no notice be taken of its gambols, it ceases them immediately, and betakes itself to sleep; and when awakened from the soundest sleep, it instantly resumes its gaiety, and frolics about in as sprightly a manner as before. It never shows any ill-humour, unless when confined or teased too much; in which case it expresses its displeasure by a sort of murmur. In the midst of twenty people, this little animal distinguishes my voice, seeks me out, and springs over every body to come to me. His play with me is the most lovely and caressing, with his two little paws he pats me on the chin with an air and manner expressive of delight. This and a thousand other preferences, show that his attachment is real. When he sees me dressed to go out, he will not leave me; and it is not without some trouble, that I can disengage myself from him; he then hides himself behind a cabinet near the door, and jumps upon me as I pass, with so much celerity, that I often can scarcely perceive him. He seems to resemble a squirrel in vivacity, agility, voice, and in his manner of murmuring. During the summer, he squeaks and runs all the night long; and since the commencement of the cold weather I have not observed this. Sometimes when the sun shines while he is playing on the bed, he turns and tumbles about, and murmurs for awhile."

with still greater boldness and avidity. In summer, it ventures farther from the house: and particularly goes into those places where the rat, its chiefest prey, goes before it. Accordingly, it is found in the lower grounds, by the side of waters, near mills, and often is seen to hide its young in the hollow of a tree.

The female takes every precaution to make an easy bed for her little ones: she lines the bottom of her hole with grass, hay, leaves, and moss, and generally brings forth from three to five at a time. All animals of this, as well as those of the dog kind, bring forth their young with closed eyes; but they very soon acquire strength sufficient to follow the dam in her excursions, and assist in her projects of petty rapine. The weasel, like all others of its kind, does not run on equably, but moves by bounding; and when it climbs a tree, by a single spring it gets a good way from the ground. It jumps in the same manner upon its prey: and, having an extremely limber body, evades the attempts of much stronger animals to seize it.

This animal, like all of its kind, has a very strong smell; and that of the weasel is peculiarly fœtid. This scent is very distinguishable in those creatures, when they void their excrement; for the glands which furnish this fœtid substance, which is of the consistence of suet, open directly into the orifice of the anus, and taint the excrement with the strong effluvia. The weasel smells more strongly in summer than in winter; and more abominably when irritated or pursued, than when at its ease. It always preys in silence, and never has a cry except when struck, and then it has a rough kind of squeaking, which at once expresses resentment and pain. Its appetite for animal food never forsakes it; and it seems even to take a pleasure in the vicinity of putrefaction. Buffon tells us of one of them being found, with three young ones, in the carcass of a wolf that was grown putrid, and that had been hung up, by the hind-legs, as a terror to others. Into this horrid retreat the weasel thought proper to retire to bring forth her young; she had furnishing the cavity with hay, grass, and leaves; and the young were just brought forth when they were discovered by a peasant passing that way.*

THE ERMINE, or STOAT.—Next to the weasel in size, and perfectly alike in figure, is the ermine. The stoat or ermine, differs from the weasel in size, being usually nine inches long; whereas the former is not much above six. The tail of the ermine is always tipped with black, and is longer in proportion to the body and more furnished with hair. The edges of the ears and the end of the toes in this animal

(Ermine, or Stoat.)

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* Ferocity of the Weasel.—One fine summer evening, about thirty years ago, as a Mr. Brown was returning from Gilmerton, near Edinburgh, by the Dalkeith road, he observed on the high ground, at a considerable distance, betwixt this and Craigmillar Castle, a man who was leaping about, performing a number of antic gestures, more like those of a maniac than a sane person. After contemplating this apparently absurd conduct, Mr. Brown began to think it might be some unfortunate maniac, and climbing over the wall, made directly towards him; and when he had got pretty near, he perceived that this man had been attacked, and was defending himself against the assault of a number of small animals, which he at first mistook for rats, but which, in fact, turned out, on getting closer, to be a colony of from fifteen to twenty weasels, which the unfortunate man was tearing from him, and endeavouring to keep from his throat. Mr. Brown joined in the combat, and having a stick, contrived to hit several, and laid them lifeless. Seeing their numbers decreasing, the animals became intimidated, and speedily fled towards a rock hard by, and disappeared in its fissures. The gentleman was nearly overcome by fatigue and exhaustion, having been engaged in the struggle with the weasels, as far as he could

are of a yellowish white; and although it is of the same colour with the weasel, being of a lightish brown, and though both this animal, as well as the weasel, in the most northern parts of Europe, changes its colour in winter, and becomes white; yet even then the weasel may be easily distinguished from the ermine by the tip of the tail, which in the latter is always black.

It is well known that the fur of the ermine is the most valuable of any hitherto known; and it is in winter only that this little animal has it of the proper colour and consistence. In summer, the ermine, as was said before, is brown, and it may at that time more properly be called the stoat. There are few so unacquainted with quadrupeds as not to perceive this change of colour in the hair, which in some degree obtains in them all.

In the north of Europe and Siberia, the skin of the ermine makes a valuable article of commerce, and they are found there much more frequently than among us. In Siberia they burrow in the fields, and are taken in traps baited with flesh. In Norway they are either shot with blunt arrows or taken in traps made of two flat stones, one being propped with a stick, to which is fastened a baited string; and when the animals attempt to pull this away, the stone drops and crushes them to death. This animal is sometimes found white in Great Britain, and is then called a white weasel. Its furs, however, among us are of no value, having neither the thickness, the closeness, nor the whiteness of those which come from Siberia. The fur of the ermine, in every country, changes by time; for, as much of its beautiful whiteness is given it by certain arts known to the furriers, so its natural colour returns, and its former whiteness can never be restored again.*

THE FERRET.—The animal next in size to the ermine, is the ferret; which is a kind of domestic in Europe, though said to be originally brought from Africa into Spain, which being a country abounding in rabbits, required an animal of this kind, more than any other: however this be, it is not to be found at present among us except in its domestic state; and it is chiefly kept tame, for the purposes of the warren.

(The Ferret.)

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guess, upwards of twenty minutes; and, but for the fortunate and timely assistance of Mr. Brown, he said he must inevitably have fallen a victim to their fury, as he found himself quickly losing strength from the violence of his exertion. His chief attention was turned to keeping them from his throat, to which they seemed instinctively to direct their course. He was a powerful man, otherwise he must have sunk under their ferocity. He had squeezed two to death, and his hands were much bitten. The account he gave of the commencement of the affray, was, that he was walking slowly through the park, when he happened to see a weasel; he ran at it, and made several unsuccessful attempts to strike at it with a stick. On its getting near the rock above-mentioned, he got betwixt it and the animal, and thus cut off his means of retreat; the weasel squeaked aloud, when an instantaneous sortie was made by the whole colony, and the attack commenced. —CHAMBERS' EDINBURGH JOURNAL.

* THE ERMINE.—This handsome little animal is a common inhabitant of America. It is a bold animal, and often domesticates itself in the habitations of the fur-traders, where it may be heard the live-long night pursuing the white footed mouse. Captain Lyon, mentions his having seen an ermine hunt the foot-step of mice like a hound after a fox, and he also describes their mode of burrowing in the snow. "I now observed," says he, "a curious kind of burrow, made by the ermines, which was pushed up in the same manner, as the tracks of moles through the earth in England. These passages run in a serpentine direction, and near the hole or dwelling place the circles are multiplied, as if to render the approach more intricate." The same lively writer relates the manners of a captive ermine as follows:—"He was a fierce little fellow, and the instant he obtained daylight in his new dwelling, he flew at the bars, and shook them with the greatest fury, uttering a very shrill, passionate cry, and emitting

The ferret is about one foot long, being nearly four inches longer than the weasel. It resembles that animal in the slenderness of its body, and the shortness of its legs; but its nose is sharper, and its body more slender, in proportion to its length. The ferret is commonly of a cream colour; but they are also found of all the colours of the weasel kind; white, blackish, brown, and party-coloured. Those that are of the whitish kind, have their eyes red, as is almost general with all animals entirely of that colour. But its principal distinction from the weasel, is the length of the hair on its tail, which is much longer in the ferret than the weasel.

As this animal is a native of the torid zone, (*g*) so it cannot bear the rigours of our climate, without care and shelter; and it generally repays the trouble of its keeping, by its great agility in the warren. It is naturally such an enemy of the rabbit kind, that if a dead rabbit be presented to a young ferret, although it has never seen one before, it instantly attacks and bites it with an appearance of rapacity. If the rabbit be living, the ferret is still more eager, seizes it by the neck, winds itself round it, and continues to suck its blood till it be satiated.

Their chief use in warrens, is to enter the holes, and drive the rabbits in the nets that are prepared for them at the mouth. For this purpose, the ferret is muzzled; otherwise, instead of driving out the rabbit, it would content itself with killing, and sucking its blood at the bottom of the hole; but, by this contrivance, being rendered unable to seize its prey, the rabbit escapes from its claws, and instantly makes to the mouth of the hole with such precipitation, that it is inextricably entangled in the net placed there for its reception.

The female of this species, (*g*) is sensibly less than the male, whom she seeks with great ardour, and, it is said, often dies, without being admitted. They are usually kept in boxes, with wool, of which they make themselves a warm bed, that serves to defend them from the rigour of the climate. They sleep almost continually; and the instant they awake, they seem eager for food. They are usually fed with bread and milk. They breed twice a year. Some of them devour their young as soon as brought forth: and then become fit for the male again. Their number is usually from five to six at a litter; and this is said to consist of more females than males. Upon the whole, this is a useful, but a disagreeable and offensive animal; its scent is fœtid, its nature voracious, it is tame without any attachment, and such is its appetite for blood, that it has been known to attack and kill children in the cradle. It is very easy to be irritated, and, although at all times its smell is very offensive; it then is much more so; and its bite is very difficult of cure.

(The Polecat.)

THE POLECAT.—The Polecat is larger than the weasel, the ermine, or the ferret, being one foot five inches long; whereas, the weasel is but six inches, the ermine nine, and the ferret eleven inches. It so much resembles the ferret in form, that some have been of opinion they were one and the same animal: nevertheless, there are a sufficient number of distinctions between them: it is, in the first place, larger than the ferret; it is not quite so slender and has a blunter nose; it differs also internally, having but fourteen ribs, whereas the ferret has fifteen; and wants one of the breast bones, which is found in the ferret: however, warreners assert, that the polecat will mix with

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the strong, musky smell which I formerly noticed. No threats or teasing could induce him to retire to the sleeping place; and whenever he did so of his own accord, the slightest rubbing on the bars was sufficient to bring him out to the attack of his tormentors. He soon took food from the hand, but not until he had first used every exertion to reach and bite the fingers which conveyed it. This boldness gave me great hopes of being able to keep my little captive alive through the winter, but he was killed by an accident."

(*g*) Buffon.

Buffon

the ferret; and they are sometimes obliged to procure an intercourse between these two animals, to improve the breed of the latter, which by long confinement, is sometimes seen to abate of its rapacious disposition.

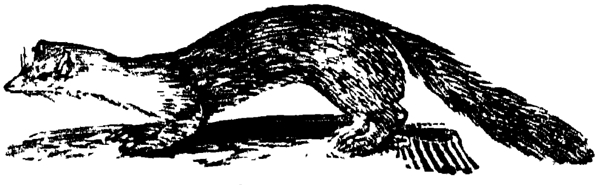
The polecat, for the most part, is of a deep chocolate colour; it is white about the mouth; the ears are short, rounded, and tipt with white; a little beyond the corners of the mouth a stripe begins, which runs backward, partly white and partly yellow: its hair, like that of all this class, is of two sorts; the long and the furry; but, in this animal, the two kinds are of different colours; the longest is black, and the shorter yellowish:(g) the throat, feet and tail, are blacker than any other parts of the body: the claws are white underneath, and brown above; and its tail is about two inches and a half.

It is very destructive to young game of all kinds: (g) but the rabbit seems to be its favourite prey; a single polecat is often sufficient to destroy a whole warren; for, with that insatiable thirst for blood which is natural to all the weasel kind, it kills much more than it can devour; and I have seen twenty rabbits at a time taken out dead, which they had destroyed, and that by a wound which was hardly perceptible. Their size, however, which is so much larger than the weasel, renders their retreat near houses much more precarious; although I have seen them burrow near a village, so as scarcely to be extirpated. But, in general, they reside in woods or thick brakes, making holes under ground of about two yards deep, commonly ending among the roots of large trees, for greater security. In winter they frequent houses and make a common practice of robbing the hen-roost and the dairy.

The polecat is particularly destructive among pigeons, (g) when it gets into a dove-house; without making so much noise as the weasel, it does a great deal more mischief; it dispatches each with a single wound in the head; and, after killing a great number, and satiating itself with their blood, it then begins to think of carrying them home. This it carefully performs, going and returning, and bringing them one by one to its hole; but if it should happen that the opening by which it got into the dove-house, be not large enough for the body of the pigeon to get through, this mischievous creature contents itself with carrying away the heads, and makes a most delicious feast upon the brains.

It is not less fond of honey, attacking the hives in winter and forcing the bees away. It does not remove far from houses in winter, as its prey is not so easily found in the woods during that season. The female brings forth young in summer, to the number of five or six at a time; these she soon trains to her own rapacious habits, supplying the want of milk, which no carnivorous quadruped has in plenty, with the blood of such animals as she happens to seize. The fur of this animal is considered as soft and warm; yet it is in less estimation than some of a much inferior kind, from its offensive smell, which can never be wholly removed or suppressed. The polecat seems to be an inhabitant of the temperate climates, (g) scarce any being found towards the north, and but very few in the warmer latitudes. The species appears to be confined in Europe, from Poland to Italy. It is certain, that these animals are afraid of the cold, as they are often seen to come into houses in winter, and as their tracks are never found in the snow near their retreats. It is probable, also, that they are afraid of heat, as they are but thinly scattered in the southern climates.

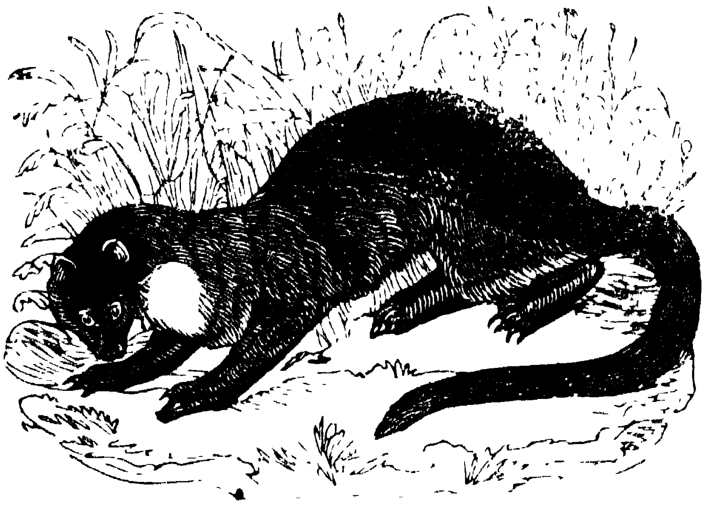
THE MARTIN.—The Martin is a larger animal than any of the former, being generally eighteen inches long, and the tail ten more. It differs from the polecat, in being about four or five inches longer; its tail also is longer in proportion, and more bushy at the end; its nose is flatter; its cry is sharper and more piercing;


(The Martin.)

(g) Ray's Synopsis. (g) British Zoology, vol. i. p. 78. (g) Buffon. (g) Buffon.

its colours are more elegant; and, what still adds to their beauty, its scent, very unlike the former, instead of being offensive, is considered as a most pleasing perfume. The martin, in short, is the most beautiful of all British beasts of prey: its head is small, and elegantly formed: its eyes lively; its ears are broad, rounded and open; its back, its sides, and tail, are covered with a fine, thick, downy fur, with longer hair intermixed; the roots are ash colour, the middle of a bright chestnut, the points black; the head is brown, with a slight cast of red; the legs, and upper sides of the feet, are of a chocolate colour; the palms, or under sides, are covered with a thick down, like that of the body; the feet are broad, the claws white, large and sharp, well adapted for the purposes of climbing; but, as in others of the weasel kind, incapable of being sheathed or unsheathed at pleasure; the throat and breast are white; the belly of the same colour with the back, but rather paler; the hair on the tail is very long, especially at the end, where it appears much thicker than near the insertion.

There is also a variety of this animal, called the yellow-breasted martin, which in no respect differs from the former, except that this has a yellow breast, whereas the other has a white one: the colour of the body also is darker; and, as it lives more among trees than the other martin, its fur is more valuable, beautiful and glossy. The former of these Buffon calls the Fouine; the latter, simply the Martin; and he supposes them to be a distinct species: but, as they differ only in colour, it is unnecessary to embarrass history by a new distinction, where there is only so minute a difference.


(The Yellow breasted Martin.)

The yellow-breasted martin is much more common in France than in England; and yet even there this variety is much scarcer than that with the white breast. The latter keeps nearer houses and villages, to make its petty ravages among the sheep and the poultry; the other keeps in the woods, and leads in every respect a savage life, building its nest on the tops of trees, and living upon such animals as are entirely wild like itself. About night-fall it usually quits its solitude to seek its prey, hunts after squirrels, rats, and rabbits; destroys great numbers of birds and their young, takes the eggs from the nest, and often removes them to its own without breaking. (*g*) The instant the martin finds itself pursued by dogs, for which purpose there is a peculiar breed, that seems fit for this chase only, it immediately makes to its retreat, which is generally in the hollow of some tree, towards the top, and which it is impossible to come at without cutting it down. Their nest is generally the original tenement of the squirrel, which that little animal bestowed great pains in completing: but the martin having killed and dispossessed the little architect, takes possession of it for its own use, enlarges its dimensions, improves the softness of the bed, and in that retreat brings forth its young. Its litter is never above three or four at a time; they are brought forth with the eyes closed, as in all the rest of this kind, and very soon come to a state of perfection. The dam compensates for her own deficiency of milk, by bringing them eggs and live birds, accustoming them from the beginning to a life of carnage and rapine. When she leads them from

(*g*) Brooks's Natural History.

the nest into the woods, the birds at once distinguish their enemies and attend them, as we before observed of the fox, with all the marks of alarm and animosity. Wherever the martin conducts her young, a flock of small birds are seen threatening and insulting her, alarming every thicket, and often directing the hunter in his pursuit.

The martin is more common in North America than in any part of Europe.[*] These animals are found in all the northern parts of the world, from Siberia to China and Canada. In every country they are hunted for their furs, which are very valuable, and chiefly so when taken in the beginning of winter. The most esteemed part of the martin's skin is that part of it which is browner than the rest, and stretches along the back bone. Above twelve thousand of these skins are annually imported into England from Hudson's Bay, and above thirty thousand from Canada.[†]

(The Sable.)

THE SABLE.—Most of the classes of the weasel kind would have continued utterly unknown and disregarded were it not for their furs, which are finer, more glossy and soft, than those of any other quadruped. Their dispositions are fierce and untameable; their scent generally offensive; and their figure disproportioned and unpleasing. The knowledge of one or two of them would, therefore, have sufficed curiosity; and the rest would probably have been confounded together, under one common name, as things useless and uninteresting, had not their skins been coveted by the vain, and considered as capable of adding to human magnificence or beauty.

Of all these, however, the skin of the sable[‡] is the most coveted, and held in the highest esteem. It is of a brownish black, and the darker it is, it becomes the more valuable. A single skin, though not above four inches broa , is often valued at ten or fifteen pounds; (*g*) the fur differing from others in th , that it has no grain; so that, rub it which way you will, it is equally smooth and unresisting.

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[*] THE PINE-MARTIN.—The pine-martin inhabits the woody districts in the northern parts of America, from the Atlantic to the Pacific, in great numbers, and has been observed to be particularly abundant where the trees have been killed by fire, but are still standing. It preys on mice, hares, and partridges, and in summer on small birds' eggs. A partridge's head, with the feathers, is the best bait for the log traps in which this animal is taken. It does not reject carrion, and often destroys the hoards of meat and fish laid up by the natives, when they have accidentally left a crevice by which it
The Martin, when its retreat is cut off, shows its teeth, sets up its hair, arches its back, and makes a hissing noise like a cat. It will seize a dog by the nose, and bite so hard, that unless the latter is accustomed to the combat, it suffers the little animal to escape. It may be easily tamed, and it soon acquires an attachment for its master, but it never becomes docile. Its flesh is occasionally eaten, though it is not prized by the Indians.—RICHARDSON'S AMERICAN ZOOLOGY.

[†] THE GUINEA MARTIN is of a dark brown colour: its forehead white, and its neck with a long narrow stripe on the side. Its fur is sprinkled with black and white; its snout is long, and of a deep, black colour; the crown is whitish grey, and the belly of a fine chestnut. The length of the body is in general nearly two feet, and the tail five inches. The Woolly Martin inhabits Cayenne: the body is about sixteen inches long and the tail nine. The snout is long and slender; the upper jaw is considerably longer than the lower; its ears are short and rounded, and its legs short and stout. The body is covered with woolly hair, and its tail long and taper.

[‡] SABLES.—Sables are numbered among the most valuable of furs. From an abstract drawn up by the late Dr. Forster, from Muller's Account of Commercial History, it appears that the price varies from one to ten pounds sterling and above. The blackest, and those which have the finest bloom or gloss, are reputed the best. The very best are said to come from the environs of *Nertchinsk* and *Yakutsk*, and in the latter district, the country about the river *Ud*, sometimes affords Sables of which a single fur is sold at the rate of sixty or seventy rubles, or twelve or fourteen pounds sterling. Sometimes the furs of sables are fraudulently dyed, and otherwise prepared, in order to give them a more intense colour, but these are very inferior to the fine, natural ones, and are easily distinguished on scrutiny.—SHAW.

Sables generally inhabit along the banks of rivers, in shady places, and in the thickest woods. They leap with great ease from tree to tree, and are said to be afraid of the sun, which tarnishes the lustre of their robes. They are chiefly hunted in winter for their skins, during which part of the year they are only in season. They are mostly found in Siberia, and but very few in any other country of the world; and this scarcity it is which enhances their value. The hunting of the sable chiefly falls to the lot of the condemned criminals, who are sent from Russia into these wild and extensive forests that, for a great part of the year, are covered with snow; and in this instance, as in many others, the luxuries and ornaments of the vain, are wrought out of the dangers and the miseries of the wretched. These are obliged to furnish a certain number of skins every year, and are punished if the proper quantity be not provided.

The sable is also killed by the Russian soldiers, who are sent into those parts to that end. They are taxed a certain number of skins yearly, like the former, and are obliged to shoot with only a single ball, to avoid spoiling the skin, or else with cross-bow and blunt arrows. As an encouragement to the hunters, they are allowed to share among themselves the surplus of those skins which they thus procure; and this, in the process of six or seven years, amounts to a very considerable sum. A colonel, during his seven years stay, gains about four thousand crowns for his share, and the common men six or seven hundred each for theirs.

THE ICHNEUMON.—The Ichneumon, which some have injudiciously denominated the Cat of Pharaoh, is one of the boldest and most useful animals of all the weasel kind. In the kingdom of Egypt, where it is chiefly bred, it is used for the same purposes that cats are in Europe, and is even more serviceable, as being more expert in catching mice than they. This animal is usually of the size of the martin, and greatly resembles it in appearance, except that the hair, which is of a grisly black, is much rougher and less downy.

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The Ichneumon, with all the strength of a cat, has more instinct and agility; a more universal appetite for carnage, and a greater variety of powers to procure it.(*g*) Rats, mice, birds, serpents, lizards and insects, are all equally pursued; it attacks every living thing which it is able to overcome, and indiscriminately preys on flesh of all kinds. Its courage is equal to the vehemence of its appetite. It fears neither the force of the dog nor the insiduous malice of the cat: neither the claws of the vulture nor the poison of the viper. It makes war upon all kinds of serpents with great avidity, seizes and kills them how venomous soever they be; and we are told that when it begins to perceive the effects of their rage, it has recourse to a certain root, which the Indians call after its name, and assert to be an antidote for the bite of the asp or the viper.

But what this animal is particularly serviceable to the Egyptians for is, that it discovers and destroys the eggs of the crocodile. It also kills the young ones that have not as yet been able to reach the water; and, as fable usually goes hand in hand with truth it is said that the ichneumon sometimes enters the

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(*g*) Regnard (*g*) The rest of this description is extracted from Mr. Buffon, except where marked with commas.

mouth of the crocodile, when it is found sleeping on the shore, boldly attacks the enemy in the inside, and at length, when it has effectually destroyed it, eats its way out again.

The ichneumon when wild generally resides along the banks of rivers; and in times of inundation makes to the higher ground, often approaching inhabited places in quest of prey. It goes forward silently and cautiously, changing its manner of moving according to its necessities. Sometimes it carries the head high, shortens its body, and raises itself upon its legs; sometimes it lengthens itself and seems to creep along the ground; it is often observed to sit upon its hind legs like a dog when taught to beg; but more commonly it is seen to dart like an arrow upon its prey, and seize it with inevitable certainty. Its eyes are sprightly and full of fire, its physiognomy sensible, its body nimble, its tail long, and its hair rough and various. Like all of its kind, it has glands that open behind and furnish an odorous substance. Its nose is too sharp, and its mouth too small to permit its seizing things that are large; however, it makes up by its courage and activity its want of arms; it easily strangles a cat though stronger and larger than itself; and often fights with dogs, which, though never so bold, learn to dread the ichneumon as a formidable enemy. It also takes the water like the otter, and, as we are told, will continue under it much longer.

This animal grows fast and dies soon It is found in great numbers in all the southern parts of Asia, from Egypt to Java; and it is also found in Africa, particularly at the Cape of Good Hope. It is domestic, as was said, in Egypt, but in our colder climates it is not easy to breed or maintain them, as they are not able to support the rigour of our winters. Nevertheless they take every precaution that instinct can dictate to keep themselves warm; they wrap themselves up into a ball, hiding the head between the legs, and in this manner continue to sleep all day long

This animal was one of those formerly worshipped by the Egyptians, who considered every thing that was serviceable to them as an emanation of the Deity, and worshipped such as the best representatives of God below. Indeed, if we consider the number of eggs which the crocodile lays in the sand at a time, which often amount to three or four hundred, we have reason to admire this little animal's usefulness as well as industry in destroying them, since otherwise the crocodile might be produced in sufficient numbers to over-run the whole earth.

THE STINKARDS.—This is a name which our sailors give to one or two animals of the weasel kind, which are chiefly found in America. All the weasel kind, as was already observed, have a very strong smell; some of them indeed approaching to a perfume, but the greatest number most insupportably fœtid. But the smell of our weasels, and ermine, and polecats, is fragrance itself when compared to that of the *squash* and the *skunk*, which have been called the Polecats of America.*

(The Skunk.)

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*The Skunk or Stinkard—The fluid of this animal, which is of a deep yellow colour, is contained in a small bag placed at the root of the tail. Mr Graham says that he knew several Indians who lost their eye-sight in consequence of inflammation, produced by this fluid, having been thrown into them by the animal—which has the power of ejecting it to the distance of upwards of four feet. "I have known a dead skunk, thrown over the stockades of a trading post, produce instant nausea in several women in a house with closed doors, upwards of a hundred yards distant. The odour has some resemblance

As to the perfumes of musk and civet, we know that a single grain will diffuse itself over a whole house, and continue for months to spread an agreeable odour, without diminution. However, the perfume of the musk or the civet is nothing, either for strength or duration, to the insupportable odour of these. It is usually voided with their excrement; and if but a single drop happens to touch any part of a man's garment, it is more than probable that he can never wear any part of it more.

In describing the effects produced by the excrement of these animals, we often hear of its raising this diabolical smell by its urine. However, of this I am apt to doubt; and it should seem to me, that, as all the weasel kind have their excrements so extremely fœtid from the cause above mentioned, we may consider these also as being fœtid from the same causes. Besides, they are not furnished with glands to give their urine such a smell; and the analogy between them and the weasel kind being so strong in other respects, we may suppose they resemble each other in this. It has also been said that they take this method of ejecting their excrement to defend themselves against their pursuers; but it is much more probable that this ejection is the convulsive effect of terror, and that it serves as their defence without their own concurrence. Certain it is, that they never smell thus horridly, except when enraged or affrighted, for they are often kept tame about the houses of the planters of America, without being very offensive.

The habitudes of all these animals are the same, living like all the rest of the weasel kind, as they prey upon smaller animals and birds' eggs. The squash, for instance, burrows like the polecat in the clefts of rocks, where it brings forth its young. It often steals into farmyards, and kills the poultry, eating only their brains. Nor is it safe to pursue or offend it, for then it calls up all its scents, which are its most powerful protection. At that time neither men nor dogs will offer to approach it; the scent is so strong, that it reaches for half a mile round, and more near at hand is almost stifling. If the dogs continue to pursue, it does all in its power to escape, by getting up a tree, or by some such means; but if driven to an extremity, it then lets fly upon the hunters; and if it should happen that a drop of this fœtid discharge falls in the eye, the person runs the risk of being blinded for ever.(*g*)

The dogs themselves instantly abate of their ardour, when they find this extraordinary battery played off against them; they instantly turn tail, and leave the animal undisputed master of the field; and no exhortations can ever bring them to rally. "In the year 1749," says Kalm, "one of these animals came near the farm where I lived. It was in winter time, during the night; and the dogs that were upon the watch, pursued it for some time, until it discharged against them. Although I was in my bed a good way off, I thought I should have been suffocated; and the cows and oxen, by their lowings, showed how much they were affected by the stench. About the end of the same year, another of these animals crept into our cellar, but did not exhale the smallest scent, because it was not disturbed. A foolish woman, however, who perceived it at night, by the shining of its eyes, killed it, and at that moment its stench began to spread. The whole cellar was filled with it to such a degree, that the woman kept her bed for several days after; and all the bread, meat, and other provisions, that were kept there, were so infected, that they were obliged to be thrown out of doors."

THE GENETTE.—From the squash, which is the most offensive animal in nature, we come to the genette, which is one of the most beautiful and pleasing. Instead of the horrid stench with which the former affects us, this has a most

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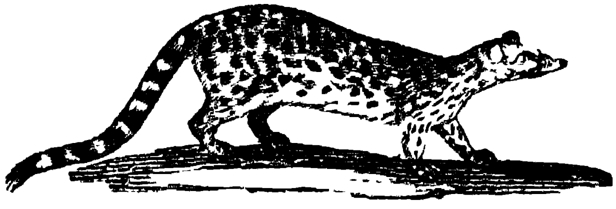
to that of garlic, although much more disagreeable. One may, however, soon become familiarized with it; for, notwithstanding the disgust it produces at first, I have managed to skin a couple of recent specimens by recuring to the task at intervals. When care is taken not to soil the carcass with any of the strong smelling fluid, the meat is considered by the natives to be excellent food"—RICHARDSON'S NORTH AMERICAN ZOOLOGY.

(*g*) Voyage de Kalm, as quoted by Buffon, vol. xxvii. p. 93.

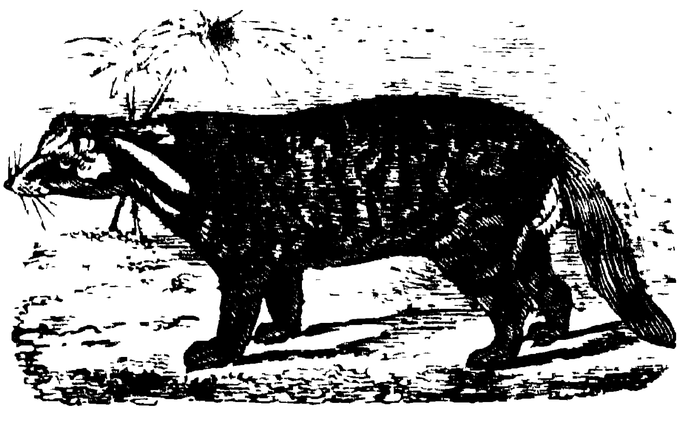
grateful odour; more faint than civet, but to some, for that reason, more agreeable. This animal is rather less than the martin: though there are genettes of different sizes; and I have seen one rather larger. It also differs somewhat in the form of its body. It is not easy, in words, to give an idea of the distinction.


(Genette.)

The genette, like all the rest of the weasel kinds, has glands, that separate a kind of perfume, resembling civet, but which soon flies off. These glands open differently from those of other animals of this kind; for, as the latter have their apertures just at the opening of the anus, these have their aperture immediately under it; so that the male seems, for this reason, to the superficial observer to be of two sexes.

It resembles the martin very much in its habits and disposition;(g) except, that it seems tamed much more easily. Belon assures us, that he has seen them in the houses at Constantinople as tame as cats; and that they were permitted to run every where about, without doing the least mischief. For this reason they have been called the cats of Constantinople; although they have little else in common with that animal, except their skill in spying out and destroying vermin. Naturalists pretend that it inhabits only the moister grounds, and chiefly resides along the banks of rivers, having never been found in mountains, nor dry places. The species is not much diffused; it is not to be found in any part of Europe, except Spain and Turkey; it requires a warm climate to subsist and multiply in; and yet it is not to be found in the warmer regions either of India or Africa. From such as have seen its uses at Constantinople, I learn, that it is one of the most beautiful, cleanly, and industrious animals in the world; that it keeps whatever house it is in, perfectly free from mice and rats, which cannot endure its smell. Add to this, its nature is mild and gentle, its colours, various and glossy, its fur valuable; and, upon the whole, it seems to be one of those animals that, with proper care, might be propagated amongst us, and might become one of the most serviceable of our domestics.

THE CIVET.—Proceeding from the smaller to the greater of this kind, we come, in the last place, to the civet, which is much larger than any of the former; for as the martin is not above sixteen inches long, the civet is found to be above thirty. Buffon distinguishes this species into two kinds; one of which he calls the civet, and the other the zibet. The latter principally differs from the former in having the body longer and more slender, the nose smaller, the ears longer and broader; no mane or long hair running down the back in the latter; and the tail is longer and better marked with rings of different colours, from one end to the other.


(Civet.)

The civet resembles animals of the weasel kind in the long slenderness of its body, the shortness of its legs, the odorous matter that exudes from the glands behind, the softness of its fur, the number of its claws, and their incapacity of being sheathed. It differs from them in being much larger than any hitherto described; in having the nose lengthened, so as to resemble that of the fox: the tail long and tapering to a point; and its ears straight, like those of a cat. The colour of the civet varies: it is commonly ash, spotted with black: though it is whiter in the female, tending to yellow; and the spots are much larger, like those of a panther. The colour on the belly, and under the throat, is black; whereas the other parts of the body are black or streaked with grey This animal varies in its colour, being sometimes streaked, as in our kind of cats called tabbies. It has whiskers, like the rest of its kind; and its eye is black and beautiful.

(g) Buffon, vol. xix. p. 187.

The opening of the pouch or bag, which is the receptacle of the civet, differs from that of the rest of the weasel kind, not opening into, but under, the anus. Beside this opening, which is large, there is still another lower down; but for what purposes designed, is not known. The pouch itself is about two inches and a half broad, and two long; its opening makes a chink, from the top downwards that is about two inches and a half long; and is covered on the edges, and within, with short hair: when the two sides are drawn asunder, the inward cavity may be seen, large enough to hold a small pullet's egg: all round this are small glands, opening and furnishing that strong perfume which is so well known, and is found, in this pouch, of the colour and consistence of pomatum. Those who make it their business to breed these animals for their perfume, usually take it from them twice or thrice a week, and sometimes oftener. The animal is kept in a long sort of box, in which it cannot turn round. The person, therefore, opens this box behind, drags the animal backwards by the tail, keeps it in this position by a bar before, and with a wooden spoon, takes the civet from the pouch, as carefully as he can; then lets the tail go, and shuts the box again. The perfume, thus procured, is put into a vessel, which he takes care to keep shut; and when a sufficient quantity is procured, it is sold to very great advantage.

The civet,(g) although a native of the warmest climates, is yet found to live in temperate, and even cold countries, provided it be defended carefully from the injuries of the air. Wherefore, it is not only bred among the Turks, the Indians, and Africans, but great numbers of these animals are also bred in Holland, where this scraping people make no small gain of its perfume. The perfume of Amsterdam is reckoned the purest of any; the people of other countries adulterating it with gums, and other matters, which diminish its value, but increase its weight. The quantity which a single animal affords generally depends upon its health and nourishment. It gives more in proportion as it is more delicately and abundantly fed. Raw flesh, hashed small, eggs, rice, birds, young fowls, and particularly fish, are the kinds of food the civet most delights in. These are to be changed and altered, to suit and entice its appetite, and continue its health. It gets but very little water; and although it drinks but rarely, yet it makes urine very frequently; and, upon such occasions, we cannot, as in other animals, distinguish the male from the female.

The perfume of the civet is so strong that it communicates itself to all parts of the animal's body; the fur is impregnated thereby, and the skin penetrated to such a degree, that it continues to preserve the odour for a long time after it is stript off.*

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* THE MUSK POUCH OF THE CIVET.—The odoriferous substance produced by the civet, forms, especially in the east, an object of considerable commerce. Its virtues are greatly vaunted among ourselves, and it was once the fashion among those who piqued themselves on their elegance, to use it as a perfume; as it has since been to use musk and amber for the same purpose. It still enters into the composition of some medicament and perfumes, but its consumption is prodigiously diminished. It used to be brought from the Indies and from Africa, into Europe, by the way of Alexandria and Venice.

In the East the civet is brought up in a state of domestication for the purpose of gathering its perfume Father Poncet says, that Enfras, a town of Abyssinia, is celebrated for the civet trade, and that an immense number of these animals are there domesticated. He has seen upwards of three hundred with some merchants.—CUVIER.

(g) Buffon, vol. xix.

As to the rest, the civet is said to be a wild, fierce animal; and, although sometimes tamed, is never thoroughly familiar. Its teeth are strong and cutting, although its claws be feeble and inflexible. It is light and active, and lives by prey, as the rest of its kind, pursuing birds, and other small animals that it is able to overcome. They are sometimes seen stealing into the yards and outhouses, to seize upon the poultry: their eyes shine in the night, and it is very probable that they see better in the dark than by day. When they fail of animal food, they are found to subsist upon roots and fruits, and very seldom drink: for which reason they are never found near great waters. They breed very fast in their native climates, where the heat seems to conduce to their propagation; but in our temperate latitudes, although they furnish their perfume in great quantities, yet they are not found to multiply.—A proof that their perfume has no analogy with their appetite for generation.

(Glutton.)

THE GLUTTON.—I will add but one animal more to this numerous class of the weasel kind; namely, the glutton; which, for several reasons, seems to belong to this tribe, and this only.* We have hitherto had no precise description of this quadruped; some resembling it to a badger, some to a fox, and some to a hyæna.

The glutton, which is so called from its voracious appetite, is an animal found as well in the north of Europe and Siberia, as in the north parts of America, where it has the name of the carcajou. Amidst the variety of descriptions which have been given of it, no very just idea can be formed of its figure; and, indeed, some naturalists, among whom was Ray, entirely doubted of its existence. From the best accounts, however, we have of it, the body is thick and long, the legs short: it is black along the back, and of a reddish brown on the sides; its fur is held in the highest estimation, for its softness and beautiful gloss; the tail is bushy, like that of the weasel, but rather shorter; and its legs and claws better fitted for climbing trees, than for running along the ground. Thus far it entirely resembles the weasel; and its manner of taking its prey is also by surprise, and not by pursuit.

It is chiefly in North America that this voracious creature is seen lurking among the thick branches of trees, in order to surprise the deer, with which the extensive forests of that part of the world abound. Endued with a degree of patience equal to its rapacity, the glutton singles out such trees as it observes marked by the teeth or the antlers of the deer; and is known to remain there watching for several days together. If it has fixed upon a wrong tree, and finds that the deer have either left that part of the country, or cautiously shun the place, it reluctantly descends, pursues the beaver to its retreat, or even ventures into the water in pursuit of fishes. But if it happens that, by long attention, and keeping close, at last the elk or the rein-deer happens to pass that way, it at once darts down upon them, sticks its claws between their shoulders, and remains there unalterably firm. It is in vain that the large frighted animal increases its speed, or threatens with its branching horns; the glutton having taken possession of its post, nothing can drive it off; its enormous prey drives rapidly along amongst the thickest woods, rubs itself against the largest trees, and tears down the branches with its expanded horns; but still its insatiable foe sticks behind, eating its neck, and digging its passage to the great blood-vessels that lie in that part. Travellers who wander through those deserts, often see pieces of the glutton's skin sticking to the trees, against which it was rubbed by the deer. But the animal's voracity is greater than its feelings, and it never seizes without bringing down its prey. When, therefore, the deer, wounded, and feeble with the loss of blood, falls, the glutton is seen to make up for its former abstinence, by its present voracity. As it is not possessed of a feast of this kind every day, it resolves to lay in a store to serve it for a good while to come. It is, indeed, amazing how much one of these animals can eat at a time! That which was seen by Klein, although without exercise or air, although taken from its native climate, and enjoying but an indifferent state of health, was yet seen to eat thirteen pounds of flesh every day, and yet remained unsatisfied. We may, therefore, easily conceive how much more it must devour at once, after a long fast, of a food of its own procuring, and in the climate most natural to its constitution.

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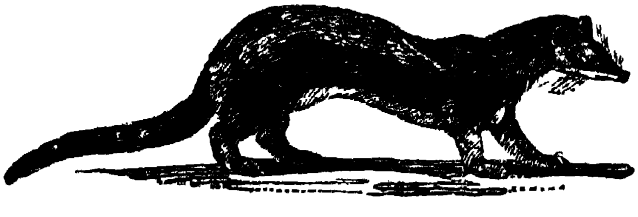
* The Glutton.—This animal is now ascertained to be a species of bear. It is about three feet long, besides the tail, which is a foot in length. The variety called the Wolverine, is distinguished by its superior size, in the colour of its body, which is dull ferruginous, with the front, throat, and longitudinal stripe on the body, whitish.

A life of necessity generally produces a good fertile invention. The glutton, continually pressed by the call of appetite, and having neither swiftness nor activity to satisfy it, is obliged to make up by stratagem the defects of nature. It is often seen to examine the traps and the snares laid for other animals, in order to anticipate the fowlers. It is said to practise a thousand arts to procure its prey, to steal upon the retreats of the rein-deer, the flesh of which animal it loves in preference to all others; to lie in wait for such animals as have been maimed by the hunters; to pursue the isatis while it is hunting for itself; and, when that animal has run down its prey, to come in and seize upon the whole, and sometimes to devour even its poor provider; when these pursuits fail, even to dig up the graves, and fall upon the bodies intered there, devouring them bones and all. For these reasons, the natives of the countries where the glutton inhabits, hold it in utter detestation, and usually term it the vulture of quadrupeds. And, yet it is extraordinary enough, that being so very obnoxious to man, it does not seem to fear him.(*g*) We are told by Gamelin of one of these coming up boldly and calmly where there were several persons at work, without testifying the smallest apprehension, or attempting to run until it had received several blows, that at last totally disabled it. In all probability it came among them seeking its prey; and, having been used to attack animals of inferior strength, it had no idea of a force superior to its own. The glutton, like all the rest of its kind, is a solitary animal; and is never seen in company except with its female, with which it couples in the midst of winter. The latter goes with young about four months, and brings forth two or three at a time.(*g*) They burrow in holes as the weasel; and the male and female are generally found together, both equally resolute in defence of their young. Upon this occasion the boldest dogs are afraid to approach them; they fight obstinately, and bite most cruelly. However, as they are unable to escape by flight, the hunters come to the assistance of the dogs, and easily overpower them. Their flesh, it may readily be supposed, is not fit to be eaten; but the skins amply recompense the hunters for their toil and danger. The fur has the most beautiful lustre that can be imagined, and is prefered before all others, except that of the Siberian fox, or the sable. Among other peculiarities of this animal, Linnæus informs us, that it is very difficult to be skinned; but from what cause, whether its abominable stench, or the skin's tenacity to the flesh, he has not thought fit to inform us.



(*g*) Buffon. (*g*) Linnæan System, p. 67.

CHAP. XIV.

ANIMALS OF THE HARE KIND.[*]

Having described in the last chapter a tribe of minute, fierce, rapacious animals, I come now to a race of minute animals, of a more harmless and gentle kind, that, without being enemies to any, are preyed upon by all. As nature has fitted the former for hostility, so it has entirely formed the latter for evasion: and as the one kind subsist by their courage and activity, so the other find safety from their swiftness and their fears. The hare is the swiftest animal in the world for the time it continues; and few quadrupeds can overtake even the rabbit when it has but a short way to run. To this class also we may add the squirrel, somewhat resembling the hare and rabbit in its form and nature, and equally pretty, inoffensive, and pleasing.

If we were methodically to distinguish animals of the hare kind from all others, we might say that they have but two cutting teeth above and two below, that they are covered with a soft, downy fur, and that they have a bushy tail. The combination of these marks might perhaps distinguish them tolerably well; whether from the rat, the beaver, the otter, or any other most nearly approaching in form. But, as I have declined all method that rather tends to embarrass history than enlighten it, I am contented to class these animals together for no very precise reason, but because I find a general resemblance between them in their natural habits, and in the shape of their heads and body. I call a squirrel an animal of the hare kind, because it is something like a hare. I call the paca of the same kind, merely because it is more like a rabbit than any other animal I know of. In short, it is fit to erect some particular standard in the imagination of the reader, to refer him to some animal that he knows, in order to direct him in conceiving the figure of such as he does not know. Still, however, he should be apprized that his knowledge will be defective without an examination of each particular species: and that saying an animal is of this or that particular kind is but a very trifling part of its history.

Animals of the hare kind, like all others that feed entirely upon vegetables, are inoffensive and timorous. As nature furnishes them with a most abundant supply, they have not that rapacity after food remarkable in such as are often stinted in their provision. They are extremely active and amazingly swift, to which they chiefly owe their protection; for being the prey of every voracious animal, they are incessantly pursued. The hare, the rabbit, and the squirrel, are placed by Pyerius, in his Treatise of Ruminating Animals, among the number of those that chew the cud; but how far this may be true, I will not pretend to determine. Certain it is that their lips continually move whether sleeping or waking. Nevertheless, they chew their meat very much before they swallow it, and for that reason I should suppose that it does not want a second mastication. All these animals use their fore-paws like hands; they are remarkably salacious, and are furnished by nature with more ample powers than most others for the business of propagation. They are so very prolific, that were they not thinned by the constant depredations made upon them by most other animals, they would quickly overrun the earth.[†]

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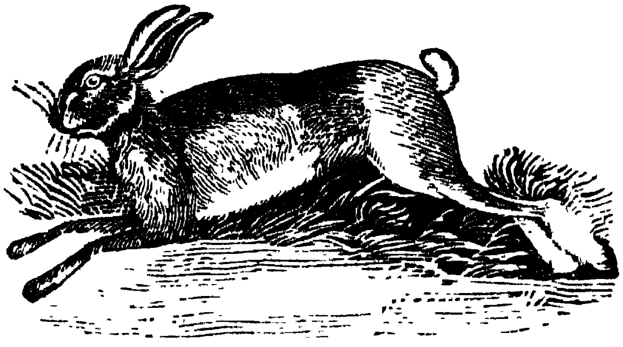
[*] Animals of the Hare kind.—The animals of this family have two front teeth in each jaw; those in the upper jaw are doubled, having two smaller ones standing behind the others; they feed entirely on vegetables, are very small, and run by a kind of leaping; they have five toes on the fore-feet, and four on the hinder.

[†] The Genus Lepus.—This genus includes many species, which are widely spread over the earth's surface, in the new world, as well as the old. All the species are alike under the continued influence of fear, and as their eyes are presumed not to be perfect during daylight, and their lateral direction prevents the animal seeing directly forward;

THE HARE.—Of all these the hare is the largest, the most persecuted, and the most timorous; all its muscles are formed for swiftness; and all its senses seem only given to direct its flight. It has very large, prominent eyes placed backwards in its head, so that it can almost see behind it as it runs. These are never wholly closed; but as the animal is continually upon the watch, it sleeps with them open. The ears are still more remarkable for their size; they are movable, and capable of being directed to every quarter; so that the smallest sounds are readily received, and the animal's motions directed accordingly. The muscles of the body are very strong, and without fat, so that it may be said to carry no superfluous burthen of flesh about it; the hinder feet are longer than the fore, which still adds to the rapidity of its motions; and almost all animals that are remarkable for their speed, except the horse, are formed in the same manner.



(Hare.)

An animal so well formed for a life of escape, might be supposed to enjoy a state of tolerable security; but as every rapacious creature is its enemy, it but very seldom lives out its natural term. Dogs of all kinds pursue it by instinct, and follow the hare more eagerly than any other animal. The cat and the weasel kinds are continually lying in ambush, and practising all their little arts to seize it; birds of prey are still more dangerous enemies, as against them no swiftness can avail, nor retreat secure; but man, an enemy far more powerful than all, prefers its flesh to that of other animals, and destroys greater numbers than all the rest. Thus pursued and persecuted on every side, the race would long since have been totally extirpated, did it not find a resource in its amazing fertility.

The hare multiplies exceedingly; it is in a state of engendering at a few months old; the females go with young but thirty days, and generally bring forth three or four at a time.(*g*) As soon as they have produced their young they are again ready for conception, and thus do not lose any time in continuing the breed. But they are in another respect fitted in an extraordinary manner for multiplying their kind; for the female, from the conformation of her womb, is often seen to bring forth, and yet to continue pregnant at the same time; or in other words, to have young ones of different ages in her womb together. Other animals never receive the male when pregnant, but bring forth their young at once. But it is frequently different with the hare; the female often, though already impregnated, admitting the male, and thus receiving a

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they rather rely on their hearing, the organ of which is very perfect, to warn them of approaching danger. Perfectly defenceless, indeed, and exposed to countless enemies, they have no chance of safety but in the expedition of their flight, and unless forewarned by the acuteness of one or more of their senses, of the approach of an enemy, they would invariably fall the victim of surprise. Their Creator, while he has left them a prey to so many other animals, has provided them with one mode of self-defence in a rapid locomotion, rendered more efficacious by a quick susceptibility of danger. Lively timidity must be attended with pain, however; and if there be any disparity in the distribution of good and evil to inferior creation, all except sportsmen, must pity creatures which exist constantly, under the excitement of acute fear.

The heart is said to be larger relatively to their parts in these than in most other animals; and it has been noticed, that Pliny observed generally, that all animals of a fearful disposition have the heart of considerable size.—GRIFFITH, in Cuvier's Animal Kingdom.

(*g*) Buffon, vol. xiii. p. 12.

second impregnation. The reason of this extraordinary circumstance is, that the womb in these animals is divided in such a manner that it may be considered as a double organ, one side of which may be filled while the other remains empty. Thus these animals may be seen to couple at every period of their pregnancy, and even while they are bringing forth the young laying the foundation of another brood.

The young of these animals are brought forth with their eyes open, and the dam suckles them for twenty days, after which they leave her, and seek out for themselves.(*g*) From this we observe, that the education these animals receive is but trifling, and the family connexion but of short duration. In the rapacious kinds the dam leads her young forth for months together; teaches them the arts of rapine; and, although she wants milk to supply them, yet keeps them under her care until they are able to hunt for themselves. But a long connexion of this kind would be very unnecessary as well as dangerous to the timid animals we are describing; their food is easily procured; and their associations, instead of protection, would only expose them to their pursuers. They seldom, however, separate far from each other, or from the place where they were produced; but make each a form at some distance, having a predilection rather for the place than each other's society. They feed during the night rather than by day, choosing the more tender blades of grass, and quenching their thirst with the dew. They live also upon roots, leaves, fruits and corn, and prefer such plants as are furnished with a milky juice. They also strip the bark of trees during the winter, there being scarce any that they will not feed on, except the lime or the alder. They are particularly fond of birch, pinks, and parsley. When they are kept tame, they are fed with the lettuce and other garden herbs: but the flesh of such as are thus brought up is always indifferent.

They sleep or repose in their forms by day, and may be said to live only by night.(*g*) It is then that they go forth to feed and couple. They do not pair, however, but in the rutting season, which begins in February; the male pursues and discovers the female by the sagacity of its nose. They are then seen, by moonlight, playing, skipping, and pursuing each other; but the least motion, the slightest breeze, the falling of a leaf is sufficient to disturb their revels; they instantly fly off, and each takes a separate way.

As their limbs are made for running, they easily outstrip all other animals in the beginning; and could they preserve their speed it would be impossible to overtake them; but as they exhaust their strength at their first efforts, and double back to the place they were started from, they are more easily taken than the fox, which is a much slower animal than they. As their hind legs are longer than the fore, they always choose to turn up hill, by which the speed of their pursuers is diminished while theirs remains the same. Their motions are also without any noise, as they have the sole of the foot furnished with hair: and they seem the only animals that have hair on the inside of their mouths.

They seldom live above seven or eight years at the utmost; they come to their full perfection in a year; and thus multiplied by seven, as in other animals, gives the extent of their lives.(*g*) They are not so wild as their dispositions and their habits seem to indicate; but are of a complying nature, and easily susceptible of a kind of education. They are easily tamed. They even become fond and caressing, but they are incapable of attachment to any particular person, and never can be depended upon; for, though taken never so young, they regain their native freedom at the first opportunity.*

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* DOMESTICATION OF HARES.—Although the hare is solitary and silent, it is not altogether so wild as its habits seem to indicate. Their disposition is gentle, and if taken young, they are capable of training and education. M. Desmarest had one a considerable time in his house; it lost all its natural wildness, and its habits had become quite familiar, at least to all it knew, but of strangers it was still fearful In winter it sat before the fire between two large Angora cats, and a sporting dog, with whom it lived on the best of terms; at table it was generally close to its master, looking for food, and if thwarted in its expectations, would beat with its fore-paws in rapid succession on the hand or arm

(*g*) Buffon, vol. xiii. p. 12.

(*g*) Ibid.

(*g*) Ibid.

But their natural instincts for their preservation are much more extraordinary than those artificial tricks that are taught them. They make themselves a form particularly in those places where the colour of the grass most resembles that of their skin; it is open to the south in winter, and to the north in summer. The hare, when it hears the hounds at a distance, flies for some time through a natural impulse, without managing its strength, or consulting any other means but speed for its safety. Having attained some hill or rising ground, and left the dogs so far behind, that it no longer hears their cries, it stops, rears on its hinder legs, and at length looks back to see if it has not lost its pursuers. But these, having once fallen upon the scent, pursue slowly, and with united skill; and the poor animal soon again hears the fatal tidings of their approach. Sometimes, when sore hunted, it will start a fresh hare, and squat in the same form; sometimes it will creep under the door of a sheep-cot, and hide among the sheep; sometimes it will run among them, and no vigilance can drive it from the flock; some will enter holes like the rabbit, which the hunters call going to *vault;* some will go up one side of the hedge, and come down the other; and it has been known, that a hare sorely hunted has got upon the top of a cut quick-set hedge, and run a good way thereon, by which it has effectually evaded the hounds. It is no unusual thing also for them to betake themselves to furze bushes, and to leap from one to another, by which the dogs are frequently misled. However, the first doubling a hare makes, is generally a key to all its future attempts of that kind, the latter being exactly like the former. The young hares tread heavier, and leave a stronger scent, than the old, because their limbs are weaker; and the more this forlorn creature tires, the heavier it treads, and the stronger is the scent it leaves. A buck, or male hare, is known by its choosing to run upon hard highways, feeding farther from the wood-sides, and making its doublings of a greater compass than the female. The male having made a turn or two about its form, frequently leads the hounds five or six miles on a stretch; but the female keeps close by some covert side, turns, crosses, and winds among the bushes like a rabbit, and seldom runs directly forward. In general, however, both male and female regulate their conduct according to the weather. In a moist day they hold by the high-ways more than at any other time, because the scent is then strongest upon the grass. If they come to the side of a grove or spring, they forbear to enter, but squat down by the side thereof, until the hounds have overshot them; and then, turning along their former path, make to their old form, from which they vainly hope for protection.*

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of the person so treating it. It acquired an excessive degree of fat; a common consequence in common with these and many other animals in a domesticated state.

As a further proof of the subserviency to the powers of man of a most predominant moral quality in this animal, its timidity, we may refer to an exhibition which has been common about the streets of London, certainly in one individual, and probably in several, of a hare which moved fearlessly about upon a table in the midst of the surrounding multitude, the tones of a hand organ, and the mixed noise and confusion of a public street. The hare was taught, further to beat a tambourine, which it did with great rapidity, and in the manner of that described by M. Desmarest, when soliciting a boon from its master; and as a still further proof how completely its fears were neutralized, it was accustomed to pull the trigger and discharge a pistol, rather large in dimensions and calibre, and commensurate consequently in report; and when it is considered that this was an affair of recurrence perhaps almost every half-hour, it can hardly be supposed that the animal was taken by surprise, as to the consequences of pulling the trigger. There are few animals so completely stupid as not to learn by reiterated practice the immediate consequences which invariably follow from any particular act, nor did the animal in question, exhibit the least alarm or shock on making the report, which would, in all probability, at least without similar training, have the effect of turning a lion.—GRIFFITH.

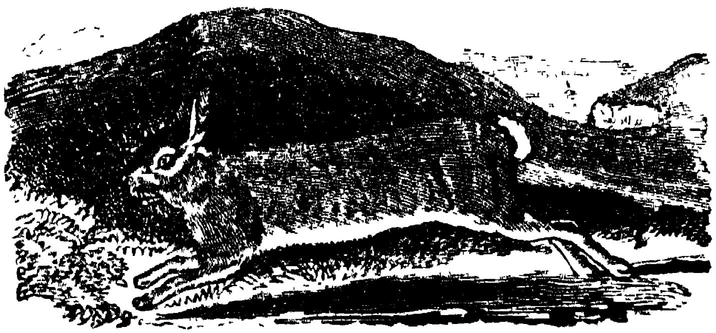
The intelligent reader will recur to the interesting paper by the poet Cowper, on the habits of his little family of leverets.—ED.

* CUNNING OF THE HARE.—An old hare, when hunted by a common hound, seems to regulate her flight according to the speed of the pursuer. She seems to know from experience, that very rapid flight would be less certain of carrying her out of the reach of

The soil and climate have their influence upon this animal, as well as on most others. In the countries bordering on the north pole, they become white in winter, and are often seen in great troops of four or five hundred running along the banks of the river Irtish, or the Jenisca, and as white as the snow they tread on. They are caught in toils for the sake of their skins, which on the spot are sold for less than seven shillings a hundred. Their fur is well known to form a considerable article in the hat manufacture; and we accordingly import vast quantities of it from those countries where the hare abounds in such plenty.* They are found also entirely black, but these in much less quantity than the former; (*g*) and even some have been seen with horns, though these but rarely. (*g*)

The hares of the hot countries, particularly in Italy, Spain and Barbary, are smaller than ours: those bred in the Milanese country are said to be the best in Europe. (*g*) There is scarce a country where this animal is not to be found, from the torrid zone to the neighbourhood of the polar circle. The natives of Guinea knock them on the head as they come down to the sides of the rivers to drink. They also surround the place where they are seen in numbers, and clattering a short stick, which every man carries, against that which the person next him carries, they diminish their circle gradually, till the hares are cooped up in the midst. They then all together throw their sticks in among them, and with such deadly force, that they seldom fail of killing great numbers at a time. (*g*)

THE RABBIT.—The hare and the rabbit, though so very nearly resembling each other in form and disposition, are yet distinct kinds, as they refuse to mix with each other. Buffon bred up several of both kinds in the same place; but from being at first indifferent, they soon became enemies; and their combats were generally continued until one of them was disabled



(Rabbit.)

danger than a more deliberate one, whereby the chase is protracted to a greater length of time, and she can continue the exertion of her strength longer than if she exerted her full speed at first. She seems to have observed, that in grounds where there are many young shrubs, the contact of her body leaves behind her a stronger scent, and one which makes the dogs pursue her with much greater ardour and perseverance than in level plains, over which the wind skims lightly. She, therefore, avoids all thickets, and keeps as much as possible upon beaten roads; but when she is pursued by greyhounds, she runs from them as fast as she is able, and seeks for shelter in woods and thickets.

Knowing that harriers, even though they do not see her, can follow her track, she often practises an admirable stratagem to deceive them. When she has run on a considerable way in a straight line, she returns a small distance upon the road she has come, in order to render the scent very strong upon the space of the ground: she then makes several long leaps in a side direction, and thereby renders it difficult for the hounds to recover the scent. By this means the hounds are often put at fault, and the hare enabled to get considerably a-head of them.

* LEPUS VARIABILIS OR VARYING HARE.—This species of hare occurs in the Alpine districts of Scotland, seldom descends to the low countries, and never intermixes with the common hare. In the north of Europe, there is a species said to be the same with our varying hare, but it differs from it in being larger, living in plains, and migrating in troops. The varying hare becomes white in winter. This remarkable change takes place in the following manner:—About the middle of September, the grey feet begin to be white, and before the month ends, all the four feet are white, and the ears and muzzle are of a brighter colour. The white colour gradually ascends the legs and thighs, and we observe under the grey hair whitish spots, which continue to increase until the end of October, but still the back continues of a grey colour, while the eye-brows and ears are nearly white. From this period the change of colour ad-

(*g*) Klein Disp. Quadrup. p. 52.

(*g*) Dictionnaire Raisonée, Lievre.

(*g*) Johnston de Quad. lib. ii. cap. 2.

(*g*) Hist. Gen. des Voyages, tom. iv. p 171.

or destroyed.* However, though these experiments were not attended with success, I am assured that nothing is more frequent than an animal bred between these two, which like all other mules, is marked with sterility. Nay, it has been actually known that the rabbit couples with animals of a much more distant nature; and there is at present in the Museum at Brussels, a creature covered with feathers and hair, and said to be bred between a rabbit and a hen.

The fecundity of the rabbit is still greater than that of the hare; and if we should calculate the produce from a single pair, in one year, the number would be amazing. They breed seven times in a year, and bring eight young ones each time. On a supposition, therefore, that this happens regularly, at the end of four years, a couple of rabbits shall see a progeny of almost a million and a half. From hence we might justly apprehend being overstocked by their increase; but, happily for mankind, their enemies are numerous, and their nature inoffensive; so that their destruction bears a near proportion to their fertility.

But although their numbers be diminished by every beast and bird of prey, and still more by man himself, yet there is no danger of their extirpation. The hare is a poor, defenceless animal, that has nothing but its swiftness to depend

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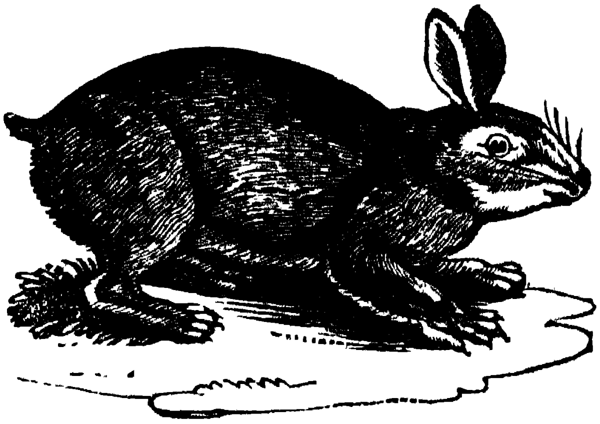
vances rapidly, and by the middle of November, the whole fur, with the exception of the tips of the ears, which remain black, is of a fine shining white. The back becomes white within eight days. During the whole of this remarkable change in the fur, *no hair falls from the animal;* hence, it appears that the hair actually changes its colour, and that there is no renewal of it. The fur retains its white colour until the month of March, or even later, depending on the temperature of the atmosphere, and by the middle of May it has again a grey colour. But the spring change is different from the winter, as the hair is completely shed.—EDINBURGH PHIL. JOURNAL.

* THE RABBIT AND THE HARE.—The rabbit in all its physicalities and relative proportions is extremely assimilated to the hare. The habits and instincts of the two form, perhaps, their greatest differences. Although provided with similar organs, clothed in the same dress, and inhabiting the same countries, they seem to have a natural aversion for each other; a hatred observes M. F. Cuvier, which nothing can soften. Love, which unites the dog and the wolf, the goat and the sheep, the horse and the zebra, cannot conciliate the rabbit and the hare. However violent their sexual desires each for its own species, and however nearly the two may be allied, they will under no circumstances approach each other; or, if by chance they meet, a combat generally follows, which not unfrequently terminates fatally to one; hence hares are not found where rabbits are plentiful.—GRIFFITH.

TAPETI OR BRAZILIAN HARE.—This is the smallest of the known species. Johnson and Gessner first refered the animal to the Guinea pig; and subsequent zoologists have treated it as a variety of the common American species; but D'Azara has more recently described and established it.

The general form of the body is that of the hare or rabbit. From the tip of the nose to the insertion of the tail, it measures about eighteen inches, and the tail itself with the hair upon it, which makes it round, does not exceed ten lines. The fur is varied, brown, black, and yellowish above, with the upper part of the head red brown, without any sprinkling of yellow; the cheeks are greyish; a lightish line passes round the eyes; the lower edge of the nose, the lips, and the under part of the head; the chest, and belly and insides of the legs, are white.



(Tapeti Hare.)

The Tapeti does not burrow in the earth, but lives in woods and sits on the surface like the common hare; when hunted, he endeavours to hide himself under the trunks of trees; or in the high grass. The flesh tastes like that of the rabbit. The female is said to bring forth but one litter of three or four in the year.—ED.

on for safety; its numbers are, therefore, every day decreasing; and in countries that are well peopled, the species are so much kept under, that laws are made for their preservation. Still, however, it is most likely that they will be at last totally destroyed; and, like the wolf or the elk in some countries be only kept in remembrance. But it is otherwise with the rabbit, its fecundity being greater, and its means of safety more certain. The hare seems to have more various arts and instincts to escape its pursuers, by doubling, squatting, and winding; the rabbit has but one art of defence alone, but in that one finds safety; by making itself a hole, where it continues a great part of the day, and breeds up its young; there it continues secure from the fox, the hound, the kite, and every other enemy.

Nevertheless, though this retreat be safe and convenient, the rabbit does not seem to be naturally fond of keeping there. It loves the sunny field and the open pasture; it seems to be a chilly animal, and dislikes the coldness of its under-ground habitation. It is, therefore, continually out, when it does not fear disturbance; and the female often brings forth her young, at a distance from the warren, in a hole, not above a foot deep at the most. There she suckles them for about a month; covering them over with moss and grass, whenever she goes to pasture, and scratching them up at her return. It has been said, indeed, that this shallow hole without the warren, is made lest the male should attack and destroy her young; but I have seen the male himself attend the young there, lead them out to feed, and conduct them back upon the return of the dam. This external retreat seems a kind of country-house, at a distance from the general habitation; it is usually made near some spot of excellent pasture, or in the midst of a field of sprouting corn. To this both male and female often retire from the warren; lead their young by night to the food which lies so convenient, and, if not disturbed, continue there till they are perfectly grown up. There they find a greater variety of pasture than near the warren, which is generally eaten bare; and enjoy a warmer sun, by covering themselves up in a shallower hole. Whenever they are disturbed, they then forsake their retreat of pleasure, for one of safety; they fly to the warren with their utmost speed; and, if the way be short, there is scarce any dog, how swift soever, that can overtake them.*

But it does not always happen that these animals are possessed of one of these external apartments; they most usually bring forth their young in the warren, but always in a hole, separate from the male. On these occasions, the female digs herself a hole, (*g*) different from the ordinary one, by being more intricate; at the bottom of which she makes a more ample apartment. This done, she pulls off from her belly a good quantity of her hair, with which she makes a kind of bed for her young. During the two first days she never leaves them; and does not stir out but to procure nourishment, which she takes with the utmost dispatch; in this manner suckling her young, for near six weeks, until they are strong, and able to go abroad themselves. During all this time, the male seldom visits their separate apartment; but when they are grown up, so as to come to the mouth of the hole, he then seems to acknowledge them as his offspring, takes them between his paws, smooths their skin, and licks their eyes; all of them, one after the other, have an equal share in his caresses.*

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* **Economy of the Rabbit.**—The rabbit is said to be originally from Spain, but it has been for ages common in the rest of Europe, and is now transported into Africa and America.

We are assured on the authority of those who have paid great attention to the subject, that rabbits live in a social state, and take an interest in each other, and even have something like respect for the right of property. In their republic, as in that of Lacedæmon, old age, parental affection, and hereditary rights are respected; the same burrow is said to pass from father to son, and lineally from generation to generation; it is never abandoned by the same family without necessity, but is enlarged as the number of the family increases by the addition of more galleries or apartments. This succession of patrimony, this right of property among these animals, has been long observed, nor have the modern investigations in zoology disproved its existence. La Fontaine thus takes notice of it:—

> Jean Lapin allégua la coutume et l'usage,
> Ce sont leur lois, dit-il, qui m'ont de ce logis,
> Rendu maitre et seigneur, et qui de pere en fils,
> L'ont de Pierre à Timon, puis a moi, Jean, transmis.

(*g*) Buffon.

Rabbits of the domestic breed, like all other animals that are under the protection of man, are of various colours; white, brown, black, and mouse-colour, the black are the most scarce; the brown, white, and mouse-colour, are in greater plenty. Most of the wild rabbits are of a brown, and it is the colour which prevails among the species; for, in every nest of rabbits, whether the parents be black or white, there are some brown ones found of the number.

The rabbit, (*g*) though less than the hare, generally lives longer. As these animals pass the greater part of their lives in their burrow, where they continue at ease and unmolested, they have nothing to prevent the regularity of their health, or the due course of their nourishment. They are, therefore, generally found fatter than the hare; but their flesh is, notwithstanding, much less delicate. That of the old ones, in particular, is hard, tough and dry; but it is said, that, in warmer countries, they are better tasted.

The tame rabbits are larger than the wild ones, from their taking more nourishment, and using less exercise; but their flesh is not so good, being more insipid and softer. The hair or fur is a very useful commodity, and is employed in England for several purposes, as well when the skin is dressed with it on, as when it is pulled off. The skins, especially the white, are used for lining cloaths, and are considered as a cheap imitation of ermine. The skin of the male is usually prefered, as being the most lasting, but it is coarser; that on the belly in either sex, is the best and finest. But the chief use made of rabbits' fur, is in the manufacture of hats; it is always mixed, in certain proportions, with the fur of the beaver; and it is said to give the latter more strength and consistence.

The Syrian rabbit, like all other animals bred in that country, is remarkable for the length of its hair; it falls along the sides in wavy wreaths, and is, in some places, curled at the end, like wool; it is shed once a year in large masses; and it often happens that the rabbit, dragging a part of its robe on the ground, appears as if it had got another leg, or a longer tail. There are no rabbits naturally in America: however, those that have been carried from Europe, are found to multiply in the West-India islands in great abundance. In other parts of that continent, they have animals that in some measure resemble the rabbits of Europe; and which most European travellers have often called hares or rabbits, as they happened to be large or small. Their giving them even the name will be a sufficient excuse for my placing them among animals of the hare kind; although they may differ in many of the most essential particulars. But before we go to the new continent, we will first examine such as bear even a distant resemblance to the hare kind at home.

THE SQUIRREL.†—There are few readers that are not as well acquainted with the figure of a Squirrel as that of the rabbit; but supposing it unknown to any, we might give them some idea of its form, by comparing it to a rabbit; with shorter ears, and a longer tail. The tail, indeed, is alone sufficient to distinguish it from all others, as it is extremely long, beautiful and bushy, spreading like a fan, and which, when thrown up behind, covers the whole body. This serves the little animal for a double purpose; when erected, it serves, like an umbrella, as a secure protection from the injuries of the heat and cold; and when extended, it is very instrumental in promoting those vast leaps that the squirrel takes from tree to tree: nay, some assert that it answers still a third purpose, and when the squirrel takes water, which it sometimes does upon a piece of bark, that its tail serves it instead of a sail. (g)

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* HABITS OF THE RABBIT — When a warren is established, so rapid is the increase, that its continuance is only limited by a want of food. Rabbits, when confined, lose some of their natural qualities, and acquire some others, nor are they so esteemed for the table. It appears also, that races of these animals, which have been long domesticated, lose altogether the instinct for burrowing, nor do the sexes pair monogamiously as they are presumed to do in their natural state; the males in particular, in a domestic state, not unfrequently destroy their offspring, though they do not eat them; whence it seems probable that domestication has the effect of eradicating from their nature the instinct of protection of the young, as well as the inclination for digging, and probably other instincts. The females, nevertheless, in this state seem still more prolific than when wild; they will sometimes produce twenty-six young in sixty days It is said, however, that after a particular race of rabbits has attained its maximum of developement in confinement, its prolific powers altogether fail.—GRIFFITH.

† THE SQUIRREL FAMILY.—This elegant tribe of quadrupeds have two front teeth in each jaw; those in the upper jaw being wedge-shaped, those in the lower pointed: on each side in the upper jaw there are five grinders, and four in the lower; they have perfect collar bones. and in most species the tail is shed on each side.

(*g*) Moutier as quoted by Buffon.

(Squirrel.)

There are few wild animals in which there are so many varieties as in the squirrel. The *common squirrel* is of the size of a small rabbit, and is rather of a more reddish brown. The belly and breast are white; and the ears beautifully ornamented with long tufts of hair, of a deeper colour than that on the body. The eyes are large, black and lively; the legs are short and muscular, like those of the rabbit; but the toes longer, and the claws sharper, so as to fit it for climbing. When it eats, or dresses itself, it sits erect, like the hare or rabbit, making use of its fore legs as hands; and chiefly resides in trees. The *grey Virginian squirrel*, which Buffon calls the Petit Gris, is larger than a rabbit, and of a greyish colour. Its body and limbs are thicker than those of the common squirrel; and its ears are shorter, and without tufts at the point. The upper part of the body, and external part of the legs, are of a fine, whitish grey, with a beautiful red streak on each side lengthways. The tail is covered with very long, grey hair, variegated with black and white towards the extremity. This variety seems to be common to both continents; and in Sweden is seen to change colour in winter. The *Barbary squirrel*, of which Buffon makes three varieties, is of a mixed colour between red and black. Along the sides there are white and brown lines, which render this animal very beautiful; but what still adds to its elegance is, that the belly is of sky blue, surrounded with white. Some of these hold up the tail erect; and others throw it forward over their body. The *Siberian white squirrel* is of the size of a common squirrel. The *Carolina black squirrel* is much bigger than the former, and sometimes tipt with white at all the extremities. The *Brazilian squirrel*, which Mr. Buffon calls the Coquallin, is a beautiful animal of this kind, and very remarkable for the variety of its colours. Its belly is of a bright yellow; its head and body

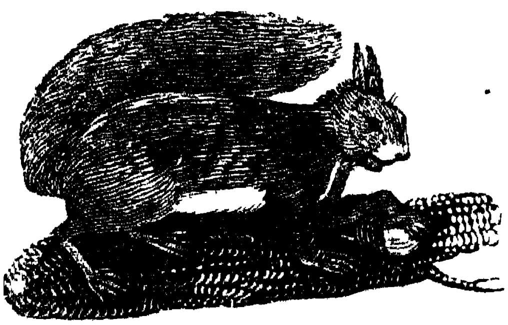
(Grey Squirrel.)

(g) Klein. Linnæus.

variegated with white, black, brown and orange colour. It wants the tufts at the extremity of its ears; and does not climb trees, as most of the kind are seen to do. To this list may be added the *little ground squirrel of Carolina*, of a reddish colour, and blackish stripes on each side; and, like the former, not delighting in trees. Lastly, the *squirrel of New Spain*, which is of a deep iron-grey colour, with seven longitudinal whitish streaks along the sides of the male, and five along those of the female. As for the flying squirrels, they are a distinct kind, and shall be treated of by themselves.* These, which I suppose to be but a few of the numerous varieties of the squirrel, sufficiently serve to show how extensively this animal is diffused over all parts of the world.

The squirrel is a beautiful little animal, (*g*) which is but half savage; and which, from the gentleness and innocence of its manners, deserves our protection. It is neither carnivorous nor hurtful, its usual food is fruits, nuts, and acorns; it is cleanly, nimble, active, and industrious; its eyes are sparkling, and its physiognomy marked with meaning. It generally, like the hare and rabbit, sits up on its hinder legs, and uses the fore paws as hands; these have five claws or toes, as they are called, and one of them is separated from the rest like a thumb. This animal seems to approach the nature of birds, from its lightness and surprising agility on the tops of trees. It seldom descends to the ground, except in case of storms, but jumps from one branch to another; feeds, in spring, on the buds and young shoots; in summer, on the ripening fruits; and particularly the young cones of the pine tree. In autumn it has an extensive variety to feast upon; the acorn, the philberd, the chestnut, and the wilding. This season of plenty, however, is not spent in idle enjoyment; the provident little animal gathers at that time its provisions for the winter, and cautiously foresees the season when the forest shall be stripped of its leaves and fruitage.

Its nest is generally formed among the large branches of a great tree, where they begin to fork off into small ones. After choosing the place where the timber begins to decay, and a hollow may the more easily be formed, the squirrel begins by making a kind of level between the forks, and then bringing moss, twigs, and dry leaves, it binds them together with great art, so as to resist the most violent storm. This is covered up on all sides; and has but a single



(North American Squirrel.)

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* The Squirrel in North America.—This little animal is an inhabitant of the forests of white spruce, which cover a great portion of the surface of the earth in the fur countries. The limits of its range to the southward have not been mentioned by American writers, but they say that it is common in the middle states. It is found as far north as the spruce trees extend, that is, to between the 68 and 69 parallel of latitude, and it is one of the most numerous animals in the northern district. It digs its burrows generally at the root of one of the largest and tallest trees it can select, and forms four or five entrances, around which very large quantities of the scales of spruce fir canes are in process of time accumulated. It does not come abroad in cold or stormy weather, but even in the depth of winter it may be seen, during a gleam of sunshine sporting among the branches of the trees. On the approach of any one, it conceals itself behind a branch, but soon betrays its position by the loud noise it makes, somewhat like the sound of a watchman's rattle, and from whence it has obtained the expressive appellation of Chickaree. When pursued and harassed it makes great leaps from tree to tree, but as soon as it observes the way clear, it descends to the ground and seeks shelter in its burrow. It does not appear to quit the tree beneath which it burrows, by choice, unless when it makes an excursion in the spring in quest of a mate. In the winter it collects the cones from the tree and carries them to the entrance of its burrow, where it picks out the seeds beneath the snow. Like the English squirrel, it makes hoards on the approach of severe weather.—Richardson's American Zoology.

(*g*) Buffon.

POINTER & ENGLISH SETTER.

THE BARBARY AND THE GROUND SQUIRREL

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opening at top, which is just large enough to admit the little animal; and this opening is itself defended from the weather by a kind of canopy, made in the fashion of a cone, so that it throws off the rain, though never so heavy. The nest thus formed, with a very little opening above, is, nevertheless, very commodious and roomy below; soft, well knit together, and every way convenient and warm. In this retreat the little animal brings forth its young, shelters itself from the scorching heat of the sun, which it seems to fear, and from the storms and the inclemency of winter, which it is still less capable of supporting. Its provision of nuts and acorns is seldom in its nest, but in the hollows of the tree, laid up carefully together, and never touched but in cases of necessity. Thus one single tree serves for a retreat and a store-house; and without leaving it during the winter, the squirrel possesses all those enjoyments that its nature is capable of receiving. But it sometimes happens that its little mansion is attacked by a deadly and powerful foe. The martin goes often in quest of a retreat for its young, which it is incapable of making for itself; for this reason it fixes upon the nest of a squirrel, and, with double injustice, destroys the tenant, and then takes possession of the mansion.

However, this is a calamity that but seldom happens: and, of all other animals the squirrel leads the most frolicsome, playful life; being surrounded with abundance, and having few enemies to fear. They are in heat early in the spring: when, as a modern naturalist says,(*g*) it is very diverting to see the female feigning an escape from the pursuit of two or three males, and to observe the various proofs which they give of their agility, which is then exerted in full force. Nature seems to have been particular in her formation of these animals for propagation; however, they seldom bring forth above four or five young at a time; and that but once a year. The time of their gestation seems to be about six weeks; they are pregnant in the beginning of April, and bring forth about the middle of May.

The squirrel is never found in the open fields, nor yet in copses or underwoods; it always keeps in the midst of the tallest trees, and, as much as possible, shuns the habitations of men. It is extremely watchful; if the tree in which it resides be but touched at the bottom, the squirrel instantly takes the alarm, quits its nest, at once flies off to another tree; and thus travels, with great ease, along the tops of the forest, until it finds itself perfectly out of danger. In this manner it continues for some hours at a distance from home, until the alarm be past away: and then it returns, by paths that to all quadrupeds but itself are utterly impassable. Its usual way of moving is by bounds; these it takes from one tree to another, at forty feet distance; and if at any time it is obliged to descend, it runs up the side of the next tree with amazing facility. It has an extremely sharp, piercing note, which most usually expresses pain; it has another, more like the purring of a cat, which it employs when pleased; at least it appeared so in that from whence I have taken a part of this description.

In Lapland, and the extensive forests to the north, the squirrels are observed to change their habitation, and to remove in vast numbers from one country to another. In these migrations they are generally seen by thousands, travelling directly forward; while neither rocks, forests, nor even the broadest waters can stop their progress What I am going to relate, appears so extraordinary, that were it not attested by numbers of the most credible historians, among whom are Klein and Linnæus, it might be rejected, with that scorn with which we treat imposture or credulity; however, nothing can be more true than that when these animals, in their progress, meet with broad rivers, or extensive lakes, which abound in Lapland, they take a very extraordinary method of crossing them. Upon approaching the banks, and perceiving the breadth of the water, they return, as if by common consent, into the neighbouring forest, each in quest of a piece of bark, which answers all the purposes of boats for wafting them over. When the whole company are fitted in this manner, they

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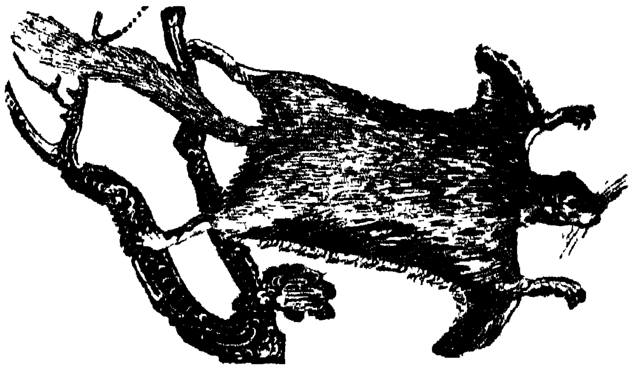
(*g*) British Zoology.

boldly commit their little fleet to the waves; every squirrel sitting on its own piece of bark, and fanning the air with its tail, to drive the vessel to its desired port. In this orderly manner they set forward, and often cross lakes several miles broad. But it too often happens that the poor mariners are not aware of the dangers of their navigation; for although at the edge of the water it is generally calm, in the midst it is always more turbulent. There the slightest additional gust of wind oversets the little sailor and his vessel together. The whole navy, that but a few minutes before rode proudly and securely along, is now overturned, and a shipwreck of two or three thousand sail ensues. This, which is so unfortunate for the little animal, is generally the most lucky accident in the world for the Laplander on the shore; who gathers up the dead bodies as they are thrown in by the waves, eats the flesh, and sells the skins for about a shilling the dozen.(g)

The squirrel is easily tamed, and it is then a very familiar animal. It loves to lie warm, and will often creep into a man's pocket or his bosom. It is usually kept in a box, and fed with hazel nuts. Some find amusement in observing with what ease it bites the nut open, and eats the kernel. In short, it is a pleasing, pretty, little domestic; and its tricks and habitudes may serve to entertain a mind unequal to stronger operations.


(Flying Squirrel.)

THE FLYING SQUIRREL.*—This little animal, which is frequently brought over to England, is less than a common squirrel, and bigger than a field mouse. Its skin is very soft, and elegantly adorned with a dark fur in some places, and light grey in others. It has large, prominent, black and very sparkling eyes, small ears, and very sharp teeth, with which it gnaws any thing quickly. When it does not leap, its tail, which is pretty enough, lies close to its back; but when it takes its spring, the tail is moved backwards and forwards from side to side. It is said to partake somewhat of the nature of the squirrel, of the rat, and of the dormouse; but that in which it is distinguished from all other animals, is its peculiar conformation for taking those leaps that almost look like flying. It is, indeed, amazing to see it at one bound dart above a hundred yards from one tree to another. They are assisted in this spring by a very peculiar formation of the skin, that extends from the fore-feet to the hinder; so that when the animal stretches its fore-legs forward and its hind-legs backward, this skin is spread out between them, somewhat like that between the legs of a bat. The surface of the body being thus increased, the little animal keeps buoyant in the air until the force of its first impulsion is expired, and then it descends. This skin, when the creature is at rest, or walking, continues wrinkled up on its sides; but when its limbs are extended, it forms a kind of web between them of above an inch broad on either side, and gives the whole body the appearance of a skin floating in the air. In this manner the flying squirrel changes place, not like a bird, by repeated strokes of its wings, but rather like a paper kite, supported by the expansion of the surface of its body; but with this difference, however, that, being naturally heavier than the air, instead of mounting, it descends; and that jump, which upon the ground would not be above forty yards, when from a higher tree to a lower may be above a hundred. This little animal is more common in America than in Europe, but not very commonly to be seen in either.* It does not seem fond of nuts or almonds, like other squirrels, but is chiefly pleased with the sprouts of the birch and the cones of the pine. Some naturalists gravely caution us not to let it get among our corn fields, where they tell us it will do a great deal of damage, by cropping the corn as soon as it begins to ear !(g)

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* Flying Squirrels.—There are eight species of flying squirrels, but there is only a a trifling difference between them. The European squirrel differs from the American species principally in having its tail full of hair, and rounded at the end, and in the colour of its body, the upper part of which is a fine grey, and the lower white. Its whole length is about nine inches, of which the tail occupies five. The *European flying squirrel* is found in the woods of Lapland and Norway, where it feeds principally on the tender branches of the beech and pine trees. In its habits of life it differs very little from the preceding species. It always sleeps during the day-time, and seldom appears abroad in bad weather. It is active through the whole winter, being frequently caught during that season, in the traps that are laid for the grey squirrels. The females, when they have young ones, never leave their nest in pursuit of food, without previously wrapping them carefully up in the moss. They pay to them the utmost attention, brooding anxiously over them, and tenderly sheltering their bodies, by their flying membrane, from the cold.

(g) Oeuvres de Regnard.

THE MARMOT †—Among the hare kind is the marmot, which naturalists have placed either among the hare kind or the rat kind, as it suited their respective systems. In fact, it bears no great resemblance to either; but of the two it approaches much nearer the hare, as well in the make of its head, as in its size, in its bushy tail, and particularly in its chewing the cud, which alone is sufficient to determine our choice in giving it its present situation. How it ever came to be degraded into the rat or the mouse, I cannot conceive, for it in no way resembles them in size, being near as big as a hare; or in its disposition, since no animal is more tractable, nor more easily tamed.

Marmot.)

The marmot is, as was said, almost as big as a hare, but it is more corpulent than a cat, and has shorter legs. Its head pretty nearly resembles that of a hare, except that its ears are much shorter. It is clothed all over with very long hair, and a shorter fur below. These are of different colours, black and grey. The length of the hair gives the body the appearance of greater corpulence than it really has, and at the same time shortens the feet so that its belly seems touching the ground. Its tail is tufted and well furnished with hair, and it is carried in a straight direction with its body. It has five claws behind, and only four before. These it uses as the squirrel does, to carry its food to its mouth; and it usually sits upon its hinder parts to feed in the manner of that little animal.

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* THE HOODED SQUIRREL.—Pennant describes a species inhabiting the woods of Java, which he denominates the hooded squirrel. It is of a rusty brown colour, paler underneath, with the flying membrane extending to the ends of all the limbs, and reaching round the shoulders and throat in the manner of a cloak, or a great coat. Its tail emarkably bushy, and spread on each side.

† THE MARMOT.—The marmots have two wedge-shaped front teeth in each jaw; five grinders on each side in the upper-jaw, and four in the lower; and they have a perfect collar bone; the fore-feet have four claws, and a very small kind of thumb; the hind-feet have five claws. It does not, as Buffon supposes, chew the cud.

(g) He may easily be made tame; but he is apt to do a great deal of damage in the corn-fields, because he will crop the corn as soon as it begins to ear.—BROOKE'S NAT. HIST.

The marmot is chiefly a native of the Alps; and when taken young is tamed more easily than any other wild animal, and almost as perfectly as any of those that are domestic.(g)* It is readily taught to dance, to wield a cudgel, and to obey the voice of its master. Like the cat, it has an antipathy to the dog; and when it becomes familiar to the family, and is sure of being supported by its master, it attacks and bites even the largest mastiff. From its squat muscular make, it has great strength joined to great agility. It has four large cutting teeth, like all those of the hare kind; but it uses them to much more advantage, since in this animal they are very formidable weapons of defence. However, it is in general a very inoffensive animal; and, except its enmity to dogs, seems to live in friendship with every creature, unless when provoked. If not prevented, it is very apt to gnaw the furniture of a house, and even to make holes through wooden partitions; from whence, perhaps, it has been compared to the rat. As its legs are very short, and made somewhat like those of a bear, it is often seen sitting up, and even walking on its hind-legs in like manner; but with the fore-paws, as was said, it uses to feed itself in the manner of a squirrel. Like all of the hare kind, it runs much swifter up hill than down; it climbs trees with great ease, and runs up the clefts of rocks, or the contiguous walls of houses, with great facility. It is ludicrously said that the Savoyards, who are the only chimney-sweepers of Paris, have learned this art from the marmot, which is bred in the same country.

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* Observations.—Having in the winter of 1830, undertaken some experiments on the hybernation of animals, I exposed four young marmots to a temperature of from 10° to 12° R. below zero. But this cold, which was perhaps too intense to determine their numbness, put them into a state of trouble, which lasted until I restored them to a temperature of 7° to 8° R. My marmots then fell asleep, with the exception of one, which escaped secretly from the room where I was making my observations. I searched for it in every adjoining place, but in vain; when, after the lapse of a fortnight, a servant, on entering a deep cellar beneath my house, felt such a resistance at the door, in trying to push it open, that she could not succeed in forcing it back. She instantly came to me, expressing her fear that some ill-disposed person had secreted himself in the cellar. I went to the spot with some friends who chanced to be with me at the time; but what was our astonishment, on forcing open the door, at finding that the marmot which I had imagined to have been lost, had possessed himself of this lodging! The animal had found an entrance by a small opening in the vault, and wishing to secure for itself an impenetrable retreat, we noticed that it had dug up the earth and scraped the wall, in order to heap up the mould and plaster against the door to about the height of two feet; and by a still further foresight, perceiving an aperture below the door of two or three inches, it had taken the precaution, before heaping up the earth and plaster, to fix against this space a piece of board, which it had detached from a shelf. Our marmot had then untied a straw rope which enveloped twenty bottles, with which it formed a bed from eight to ten inches thick, in a corner of the cellar; and afterwards, to protect itself apparently from the annoyance of the rats, the industrious animal had broken several bottles, and formed, with the greatest regularity, a half circle of the broken pieces of glass, before its bed. Unhappily, my servant roused it too hastily, and in attempting to seize it, inflicted on it a mortal wound, which thus deprived me of the pleasure I should have had of studying, in this animal, habits which result from an instinct in the marmot, more perfect than its apparent stupidity seems to indicate.

Our correspondent adds:—This mention of the marmot reminds me of a singular spot I visited in the course of a tour last summer amongst the Alps, which is a favourite resort of these animals. During a stay at Chamouni, I made an excursion, in company with some friends, to the "Jardin," a spot situated at several leagues across the Mer de Glace. The name is given to a patch of rocks which rise in the midst of a wide plain of snow, forming a horse-shoe basin of considerable extent, and inclosed on all sides but at one opening, by a circle of the highest Alps. This spot is situated at a height of about 9,000 feet, and its chief interest arises from its forming an insulated patch of verdure in the midst of a region of sterility and snows,—an oasis of spring in a desert of winter. While resting there, on a rich bed of turf and flowers, we looked around in vain for any other appearance of life or vegetation. The eye stretched across this plain of snows to the grey, craggy mountains which rose around us; or still further, through the opening of this amphitheatre, across the valley of the Mer de Glace, for several leagues, to the smooth dome of snows of Mont Blanc. The marmots burrow in these rocks in great numbers. They come out in wet weather, and towards evening, and may frequently be herd in their burrows, especially on the approach of rain, making a shrill and peculiar whistle, by imitating which, and remaining quiet on the ground, they may be attracted from their holes. The weather was fine and dry when we visited this spot, and we neither heard nor saw anything of them; and our guides predicted from this circumstance a continuance of good weather.—Zoological Magazine.

(g) Buffon, from whence the remainder of this description is taken.

These animals eat indiscriminately of whatever is presented to them: flesh, bread, fruits, herbs, roots, pulse, and insects. But they are particularly fond of milk and butter. Although less inclined to petty thefts than the cat, yet they always try to steal into the dairy, where they lap up the milk like a cat, purring all the while like that animal, as an expression of their being pleased. As to the rest, milk is the only liquor they like. They seldom drink water, and refuse wine. When pleased or caressed, they often yelp like puppies; but when irritated or frighted, they have a piercing note that hurts the ear. They are very cleanly animals, and like the cat retire upon necessary occasions; but their bodies have a disagreeable scent, particularly in the heat of summer. This tinctures their flesh, which, being very fat and firm, would be very good, were not this flavour always found to predominate.

We have hitherto been describing affections in this animal which it has in common with many others: but we now come to one which particularly distinguishes it from all others of this kind, and, indeed, from every other quadruped, except the bat and the dormouse. This is its sleeping during the winter. The marmot, though a native of the highest mountains, and where the snow is never wholly melted, nevertheless seems to feel the influence of the cold more than any other, and in a manner has all its faculties chilled up in winter.[*] This ex-

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[*] ANIMAL TEMPERATURE.—It is one of the most extraordinary as well as one of the best ascertained facts in the animal economy, though by no means as yet satisfactorily explained, that the interior heat of warm-blooded animals varies extremely little in the coldest and in the hottest climates. To the uninstructed it appears no less erroneous to say that the body is equally warm on a cold winter's morning and on the most sultry of the dog-days, as to affirm that the sun is stationary contrary to the apparent evidence of the senses; yet the one truth is as well ascertained as the other. For example, Captain Parry found that when the air was from 30° to 32° at Winter Isle, lat. 66° 11′ N., the interior temperature of the foxes when killed was from 106¾ to 98°; and at Ceylon, Dr. Davy found that the temperature of the native inhabitants differed only about one or two degrees from the ordinary standard in England. At very high temperatures, however, there is a somewhat greater difference, as appears from the ingenious experiments made by MM. Delaroche and Berger, who exposed themselves to a heat of 228°, or sixteen degrees above that of boiling water: they ascertained that at such very high temperatures there is an increase of seven or eight degrees of the centigrade thermometer. The increase of cold on the contrary does not appear to influence the temperature of the body in a similar way; and hence we discover the cause why great cold proves less injurious and fatal to animals than might be reasonably anticipated. White of Selborne, speaking of gipsies, says: "These sturdy savages seem to pride themselves in braving the severity of the winter, and in living in the open air (*sub dio*) the whole year round. Last September was as wet a month as ever was known; and yet during those deluges did a young gipsy girl lie in the midst of one of our hop-gardens on the cold ground, with nothing over her but a piece of a blanket extended on a few hazel rods bent hoop-fashion and stuck in the earth at each end, in circumstances too trying for a cow in the same condition: within this garden there was a large hop-kiln, into the chambers of which she might have retired, had she thought shelter an object worthy her attention." Some half-wild cats (*Felis domestica*), which frequented a solitary farm-house on the borders of a wood, were more attentive to their comforts than this young gipsy; since a neighbouring kiln for drying corn was their favourite resort during winter when the fire was lighted.

traordinary suspension of life and motion for more than half the year, deserves our wonder, and excites our attention to consider the manner of such a tempo-

The law by which animal temperature is thus maintained at nearly the same degree on exposure to considerable heat or cold, though it is not easy to reconcile it to any of the received theories, supplies the only known reason why some of the smaller and seemingly tender animals outlive the rigours of our severest winters. The magpie (*Pica caudata*, Ray), though rather a hardy bird, has been found having recourse to what is often practised by smaller birds—several of them huddling together during the night, to keep each other warm. A gentleman of intelligence and veracity informed us that he once saw a number of these birds (probably a young family with their parents) on a tree, in a fir plantation, sitting so closely together that they all seemed to be rolled up into a single ball. Little is known of the roosting of these birds; but among smaller species the habit in question is not uncommon. Even during the day, in severe winter weather, we have observed a similar practice in the house-sparrow (*Passer domesticus*, Ray). On a chimney top, which can be seen from our study window, we have often remarked the whole of a neighbouring colony of sparrows contest by the hour the warmest spot on the projecting brick ledge, which happened to be in the middle. Here the sun shone strongest, the kitchen fire below sent hither its most powerful influence, and here the fortunate occupant was best sheltered from the frosty wind which swept by its companions that had been jostled to the two extremities of the row. But none remained long in quiet, for as soon as the cold air pinched them on the exposed side, they removed to the middle, scolding and cackling most vociferously; and as those who held the best places refused to give them up, the new-comers got upon their backs and insinuated themselves between two of their obstinate companions, wedge-fashion, as you thurst a book into a crowded shelf. The middle places were thus successively contested, till hunger drove the whole colony to decamp in search of food.

We once witnessed, near Eltham, a similar contest for places among a family of the bottle-tit (*Parus caudatus*, Ray), whose proceedings we had been watching while they flitted from spray to spray of a hawthorn hedge in search of the eggs of a coccus (*Coccus cratægi?* Fabr.). The ground was covered with snow, and as evening approached, the little creatures, whose restless activity had no doubt tended to keep them warm, retreated from the open hedge to the shelter of a thick holly—"the leading bird," as Mr. Knapp correctly describes their manner of proceeding, "uttering a shrill cry of *twit, twit, twit*, and away they all scuttled to be first, stopping for a second, and then away again." When they had all assembled, however, on an under bough of the holly, they began to crowd together, fidgetting and wedging themselves between one another as the sparrows had done; but whether they intended to roost there, or were merely settling the order of precedence, before retiring into some hole in the tree, we did not ascertain, for in our eagerness to observe what they were about, we approached so near as to alarm them, and they flew off to a distant field.

That this contest for places among the little bottle-tits was only previous to retreating into some more snug corner for the night, appears to us probable, from the known habits of their congeners, and also from what we daily observe among sparrows. Every evening before going into their roosting holes, the sparrows assemble on some adjacent tree or house-top, squabbling and shifting places for a considerable time, and then dropping off one by one according as they seem to have agreed upon the etiquette of precedence. Hardy as they certainly are, sparrows manifest great dislike to exposure during the night; and, accordingly, they may be observed taking advantage of every variety of shelter. They are most commonly seen, indeed, creeping under the eves of houses or the cornices of pillars; but they are equally fond of a hole in a hay-stack, of getting under the lee-side of a rook's nest on a lofty tree, or of popping into a sand hole burrowed out for its nest by the bank swallow (*Hyrundo riparia*, Ray). They are exceedingly partial, on this account, to the shelter of ivy on a wall, or of a thick tuft of clematis; but when they can find such a shelter, they do not, so far as we have observed, huddle together side by side, each individual merely selecting the warmest coping of leaves he can discover.

It is not a little remarkable that the thrush and blackbird, though so careful to provide shelter and warmth for their eggs and young, show no wisdom in procuring the same comforts for themselves during winter, as they usually roost along with redwings and chaffinches in the open hedges, where they are often frozen to death in severe weather, or captured by bat fowlers. The starling (*Sturnus vulgaris*) exhibits more care for itself, by roosting in the holes of trees, in the towers of churches, or under the tiles of an old house, like the sparrows, and frequently among the thick tops of reeds in marshes. Yet will they sometimes suffer from frost even there. One winter's day in 1832, after a very keen frost in the night, when we were searching for lichens on the trees in Copenhagen fields, rary death, and the subsequent revival. But first to describe, before we attempt to discuss.

The marmot, usually, at the end of September, or the beginning of October,

we found a cock starling in a hole frozen to death. It was in very fine condition, and more perfect in plumage than we ever saw this species; but it did not appear, upon the closest examination, to have received any shot or other injury, to cause its death besides the effects of the frost.

It may be remarked, that like the sparrows and other birds which roost in holes, the starlings huddle closely together, contending for places; a circumstance, indeed, recorded by Pliny. "As touching sterlings," says he, "it is the property of the whole kind of them to fly by troops, and in their flight to gather round into a ring or ball, whiles every one of them hath a desire to be in the middest," a statement corresponding exactly with what we have above mentioned of the sparrows and bottle-tits. It is not a little interesting thus to verify facts which were observed by the ancients; and Mr. Knapp has done so in the instance of the starling now under consideration. "There is something," he remarks, "singularly curious and mysterious in the conduct of these birds previous to their nightly retirement, by the variety and intricacy of the evolutions they execute at that time. They will form themselves, perhaps, into a triangle, then shoot into a long pear-shaped figure, expand like a sheet, wheel into a ball, as Pliny observes, each individual striving to get into the centre, &c. with a promptitude more like parade movements than the actions of birds."

In the instance of the red-breast, the hedge-sparrow (*Accentor modularis*, Bechstein), and the wren (*Anorthura communis*), one can scarcely imagine how any of the species survive the winter, were it only for the difficulty they must have in procuring food. Selby, indeed, has observed wrens to perish in severe winters, particularly when accompanied with great falls of snow. "Under these circumstances," he says, "they retire for shelter into holes of walls, and to the eaves of corn and hay-stacks; and I have frequently found the bodies of several together in old nests, which they had entered for additional warmth and protection during severe storms." Buffon says a sportsman told him he had often found more than twenty collected in the same hole.

We are informed by an intelligent friend, that he once found several wrens in the hole of a wall, rolled up into a sort of ball, for the purpose, no doubt, of keeping one another warm during the night; and though such a circumstance is only to be observed by rare accident, we think it very likely to be nothing uncommon among such small birds as have little power of generating or retaining heat in cold weather. This very circumstance, indeed, was observed by the older naturalists. Speaking of wrens, the learned author of the Physicæ Curiosæ, says, "They crowd into a cave during winter to increase their heat by companionship."

Those who keep wrens in cages usually furnish them with a box, lined and covered with cloth, having a hole for entrance, where they may roost warmly during the night. Yet even in keen frost the wren does not seem, in the day-time, to care much for cold, since we have in such cases frequently heard it singing as merrily as if it had been enjoying the sunshine of summer, contrary to the remark of White, that wrens do not sing in frosty weather.

During a fall of snow, sheep seem both to take advantage of natural shelter, and to huddle together in order to economize their animal heat; and they accordingly, during a snow storm, always flee to the nearest shelter, though this is certain to end in their destruction, if the snow fall deep and lie long. It, therefore, becomes one of the most painful tasks of the shepherd, in such circumstances, to keep his sheep steadily in the very brunt of the blast. So at least we were told by an old shepherd, whom we encountered at nightfall the end of December, 1808, in a wild, mountainous pass, near Douglas, on the borders of Lanarkshire, who was actually engaged in thus guarding his flock in as heavy a fall of snow as we recollect ever witnessing. The Ettrick Shepherd, in a most interesting narrative, entitled "Snow Storms," in his Shepherd's Calendar, does not allude to this propensity in sheep; though it may be inferred that they had acted upon it on one of the occasions which he describes, from his having found a number buried under the snow by the side of a high bank, to which, no doubt, they had fled for shelter at the onset of the storm. Though sheep, from their mode of life, ought to be hardy, they exhibit an anxiety for procuring shelter well worthy of remark. It is mentioned by Lord Kames, that the ewe, several weeks before yeaning, selects some sheltered spot where she may drop her lamb with the most comfort and security; and Mr. Hogg, in the volume just referred to, gives an instance in which a ewe travelled over a great distance to the spot where she had been accustomed to drop her lambs; but what was still more remarkable, a ewe, the offspring of this ewe, though removed to a distance when a few days old, returned to the same spot to drop her first lamb. -Rennie.

prepares to fit up its habitation for the winter, from which it is never seen to issue till about the beginning or the middle of April. This animal's little retreat is made with great precaution, and fitted up with art. The apartment is very warmly stuccoed round with moss and hay, of both which they make an ample provision during the summer. As this is a work of great labour, so it is undertaken in common; some cut the finest grass, others gather it, and others take their turns to drag it into their hole. Upon this occasion, as we are told, one of them lies on its back, permits the hay to be heaped upon its belly, keeps its paws upright to make greater room; and in this manner, lying still upon its back, it is dragged by the tail, hay and all, to their common retreat. This also some give as a reason for the hair being generally worn away on their backs, as is usually the case: however, a better reason for this may be assigned, from their continually rooting up holes, and passing through narrow openings. But, be this as it will, certain it is that they all live together, and work in common to make their habitation as snug and convenient as possible. In it they pass three parts of their lives; into it they retire when the storm is high; in it they continue while it rains; there they remain when apprehensive of danger, and never stir out except in fine weather, never going far from home even then. Whenever they venture abroad, one is placed as a sentinel, sitting upon a lofty rock, while the rest amuse themselves in playing along the green fields, or are employed in cutting grass and making hay for their winter's convenience. Their trusty sentinel, when an enemy, a man, a dog, or a bird of prey approaches, apprizes its companions with a whistle, upon which they all make home, the sentinel himself bringing up the rear.*

But it must not be supposed that this hay is designed for provision; on the contrary, it is always found in as great plenty in their holes at the end as at the beginning of winter; it is only sought for the convenience of their lodging, and the advantages of their young. As to provision, they seem kindly apprized by nature that during the winter they shall not want any, so that they make no preparations for food, though so diligently employed in fitting up their abode. As soon as they perceive the first approaches of the winter, during which their vital motions are to continue in some measure suspended, they labour very diligently to close up the two entrances of their habitation, which they effect with such solidity, that it is easier to dig up the earth any where else than where they have closed it. At that time they are very fat, and some of them are found to weigh above twenty pounds; they continue so for even three months more; but by degrees their flesh begins to waste, and they are usually very lean by the end of winter. When their retreat is opened, the whole family is then discovered, each rolled into a ball, and covered up under the hay. In this state they seem entirely lifeless; they may be taken away, and even killed, without their testifying any great pain; and those who find them in this manner carry them home, in order to breed up the young, and eat the old ones. A gradual and gentle warmth revives them; but they would die if too suddenly brought near the fire, or if their juices were too quickly liquefied.

These animals produce but once a year, and usually bring forth but three or four at a time. They grow very fast, and the extent of their lives is not above nine or ten years; so that the species is neither numerous nor very much diffused. They are chiefly found in the Alps, where they seem to prefer the brow of the highest mountains to the lowest ranges, and the sunny side to that in the shade. The inhabitants of the country where they chiefly reside, when they observe the hole, generally stay till winter before they think proper to open it; for if they begin too soon, the animal wakes, and, as it has a surprising faculty of digging, makes its hole deeper in proportion as they follow. Such as kill it for food use every art to improve the flesh, which is said to have a wild taste, and to cause vomitings.(g) They, therefore, take away the fat, which is in great abundance, and salt the remainder, drying it somewhat in the manner of bacon. Still, however, it is said to be very indifferent eating.*

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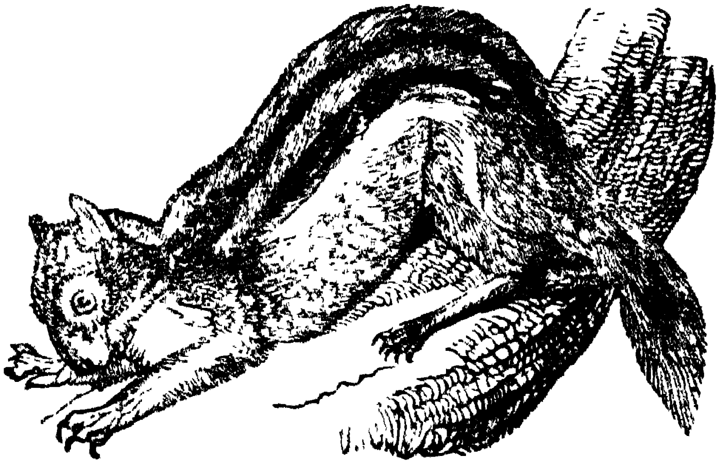
* Brute Animal Haymakers.—Marmots, in the strictest sense, make hay; they bite off the grass, turn it, and dry it in the sun. It is reported that they use an old she marmot as a cart. She lies on her back, the hay is heaped on her belly, and two others drag her home.—Arcana of Science, 1829.

THE AGOUTI.—From the marmot, which differs from the hare so much is the length of its fur, we go to the agouti, another species equally differing in the shortness of its hair.† These bear some rude resemblance to the hare and the rabbit in their form and manner of living, but sufficiently differing to require a particular description. The first of these, and that the largest, as was hinted above, is called the agouti. This animal is found in great abundance in the southern parts of America, and has by some been

(Agouti.)



(American Marmot.)

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* American Marmot.—The varieties of this animal in the north continent of America are exceedingly numerous. Richardson in his American Zoology sets forth upwards of a dozen. The "Tawny American" (*Arctomys Richardsonii*) will suit us. This animal inhabits the grassy plains that lie between the north and south branches of the Saskatchewan river, living in deep burrows, formed in the sandy soil. It is very common in the neighbourhood of Carlton House, its burrows being scattered at short distances over the whole plain. The burrows are proportionable to the size of the animal. The earth scraped out forming them is thrown up in a small mound at the mouth of the hole, and on it the animal seats itself on its hind legs, to overlook the short grass, and reconnoitre before it ventures to make an excursion. There are many little, well worn pathways, diverging from each burrow, and some of these roads are observed, in the spring, to lead directly to neighbouring holes, being most probably formed by the males going in quest of a mate. The males fight when they meet on these excursions, and it not unfrequently happens, that the one which is worsted loses a part of its tail as he endeavours to escape. They place no sentinels, and there appears to be no concert between the tawny marmots residing in the neighbourhood, every individual looking out for himself.

The above cut is a variety of the American brood.—Ed.

† The Agouti.—This animal together with the paca, apera, guinea pig, capibara, and a few other species, are now arranged under the general appellation of cavy. They are distinguished by having two wedge-shaped front teeth in each jaw, and eight grinders on each side in both jaws; they have from four to six toes on the fore-feet, and from three to five on the hinder; the tail is

(g) Dictionnaire Raisonnée, vol. iii. p. 29.

called the rabbit of that continent. But, though in many respects it resembles the rabbit, yet still in many more it differs, and is, without all doubt, an animal peculiar to the new world only. The agouti is about the size of a rabbit, and has a head very much resembling it, except that the ears are very short in comparison. It resembles the rabbit also in the arched form of its back, in the hind legs being longer than the fore, and in having four great cutting teeth, two above and two below; but then it differs in the nature of its hair, which is not soft and downy as in the rabbit, but hard and bristly like that of a sucking pig, and of a reddish brown colour. It differs also in the tail, which is even shorter than in the rabbit, and entirely destitute of hair. Lastly, it differs in the number of its toes, having but three on the hinder feet, whereas the rabbit has five. All these distinctions, however, do not countervail against its general form, which resembles that of a rabbit, and most travellers have called it by that name.

As this animal differs in form, it differs still more in habitudes and disposition. As it has the hair of a hog, so also it has its voraciousness.(g) It eats indiscriminately of all things; and when satiated, hides the remainder, like the dog or the fox, for a future occasion. It takes a pleasure in gnawing and spoiling every thing it comes near. When irritated, its hair stands erect along the back, and, like the rabbit, it strikes the ground violently with its hind feet. It does not dig a hole in the ground, but burrows in the hollows of trees. Its ordinary food consists of the roots of the country, potatoes and yams, and such fruits as fall from the trees in autumn. It uses its fore-paws like the squirrel, to carry its food to its mouth; and as its hind-feet are longer than the fore, it runs very swiftly upon plain ground or up a hill, but upon a descent it is in danger of falling. Its sight is excellent, and its hearing equals that of any other animal: whenever it is whistled to it stops to hearken. The flesh of such as are fat and well fed is tolerable food, although it has a peculiar taste, and is a little tough. The French dress it like a sucking pig, as we learn from Buffon's account; but the English dress it with a pudding in its belly, like a hare. It is hunted by dogs; and whenever it is got into a sugar-ground, where the canes cover the place, it is easily overtaken, for it is embarrassed every step it takes, so that a man may easily come up with it without any other assistance. When in the open country, it usually runs with great swiftness before the dogs until it gains its retreat, within which it continues to hide, and nothing but filling the hole with smoke can force it out. For this purpose the hunter burns faggots or straw at the entrance, and conducts the smoke in such a manner that it fills the whole cavity. While this is doing, the poor little animal seems sensible of its danger, and begs for quarter with a most plaintive cry, seldom quitting its hole till the utmost extremity. At last, when half suffocated, it issues out, and trusts once more to its speed for protection. When still forced by the dogs, and incapable of making good a retreat, it turns upon the hunters, and with its hair bristling like a hog, and standing upon its hind feet, it defends itself very obstinately. Sometimes it bites the legs of those that attempt to take it, and will take out the piece wherever it fixes its teeth.(g)

Its cry when disturbed or provoked resembles that of a sucking pig. If taken young, it is easily tamed, continues to play harmlessly about the house, and goes out and returns of its own accord. In a savage state it usually continues in the woods, and the female generally chooses the most obscure parts to bring forth her young. She there prepares a bed of leaves and dry grass, and generally brings forth two at a time. She breeds twice or thrice a year, and carries her young from one place to another, as convenience requires, in the manner of a cat. She generally lodges them when three days old in the hollow of a tree, suckling them but for a very short time, for they soon come to perfection, and it should consequently follow that they soon grow old.

very short, or none, and they have no collar-bones. They are inhabitants of warmer regions, live entirely on vegetable substances, reside under ground or beneath the roots of trees, and move with a slow and kind of leaping pace.

(g) Buffon.

(g) Ray's Synop.

THE PACA.—The paca is an animal also of South America, very much resembling the former, and like it has received the name of the American rabbit, but with as little propriety. It is about the size of a hare, or rather larger, and in figure somewhat like a sucking pig, which it also resembles in its grunting and its manner of eating. It is, however, most like the agouti, although it differs in several particulars. Like the agouti, it is covered rather with coarse hair than a downy fur. But then it is beautifully marked along the sides with small ash-coloured spots, upon an amber-coloured ground; whereas the agouti is pretty much of one reddish colour. The paca is rather more thick and corpulent than the agouti; its nose is shorter, and its hind feet have five toes; whereas the agouti has but three.

(Paca.)

The paca does not make use of its fore-paws, like the squirrel or the agouti, to carry its food to the mouth, but hunts for it on the ground, and roots like a hog. It is generally seen along the banks of rivers, and is only to be found in the moist and warm countries of South America. It is a very fat animal, and in this respect much preferable to the agouti, that is most commonly found lean. It is eaten, skin and all, like a young pig, and is considered as a great delicacy. Like the former little animal, it defends itself to the last extremity, and is very seldom taken alive. It is persecuted not only by man, but by every beast and bird of prey, who all watch its motions, and, if it ventures at any distance from its hole, are sure to seize it. But although the race of these little animals is thus continually destroyed, it finds some refuge in its hole, from the general combination; and breeds in such numbers, that the diminution is not perceptible.

To these animals may be added others, very similar both in form and disposition: each known by its particular name in its native country, but which travellers have been contented to call rabbits or hares; of which we have but indistinct notice.

To these imperfect sketches of animals little known, others less known might be added; for as nature becomes more diminutive, her operations are less attentively regarded. I shall only, therefore, add an animal more to this class, and that very well known; I mean the guinea-pig; which Brisson places among those of the rabbit-kind; and as I do not know any other set of animals with which it can be so well compared, I will take leave to follow his example.

THE GUINEA-PIG.—The guinea-pig is a native of the warmer climates:* but has been so long rendered domestic, and so widely diffused, that it is now become common in every part of the world. There are few unacquainted with the figure of this little animal; in some places it is considered as the principal favourite; and is often found even to displace the lap-dog. It is less than a rabbit, and its legs are shorter; they are scarce seen, except when it moves; and the neck, also, is so short, that the head seems stuck upon the shoulders.

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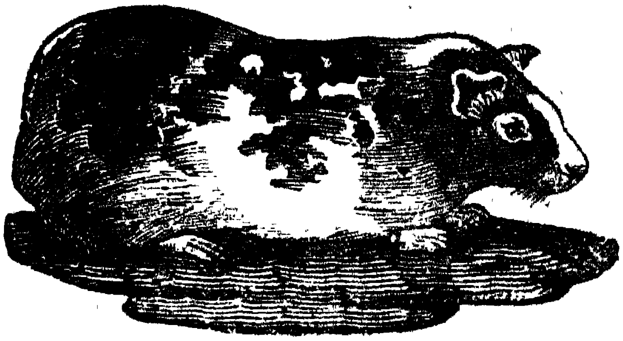
* Of Guinea and the Brazils, where it is generally of a pure, white colour, and seldom variegated with orange and black in irregular blotches, as in England. They dwell in warrens like rabbits, and would be speedily extirpated, were it not for the rapid and almost incredible multiplication of their species, six hundred being annually produced, on an average, from one female.

The ears are short, thin and transparent; the hair is like that of a sucking pig, from whence it has taken the name; and it wants even the vestiges of a tail. In other respects, it has some similitude to the rabbit. When it moves, its body lengthens like that animal; and when it is at rest, it gathers up in the same manner. Its nose is formed with the rabbit lip, except that its nostrils are much further asunder. Like all other animals in a domestic state, its colours are different; some are white, some are red, and others both red and white. It differs from the rabbit in the number of its toes, having four toes on the feet before, and but three on those behind. It strokes its head with the fore-feet like the rabbit; and, like it, sits upon the hind feet; for which purpose there is a naked callous skin on the back part of the legs and feet.


(Guinea-Pig.)

These animals are of all others the most helpless and inoffensive.(g) They are scarce possessed of courage sufficient to defend themselves against the meanest of all quadrupeds, a mouse. Their only animosity is exerted against each other; for they will often fight very obstinately; and the stronger is often known to destroy the weaker.

As to their manner of living among us, they owe their lives entirely to our unceasing protection. They must be constantly attended, shielded from the excessive colds of the winter, and secured against all other domestic animals, which are apt to attack them, from every motive, either of appetite, jealousy, or experience of their pusillanimous nature. Such indeed is their stupidity, that they suffer themselves to be devoured by the cats, without resistance; and, different from all other creatures, the female sees her young destroyed without once attempting to protect them. Their usual food is bran, parsley, or cabbage leaves; but there is scarce a vegetable cultivated in our gardens that they will not gladly devour. The carrot-top is a peculiar dainty; as also sallad; and those who would preserve their healths, would do right to vary their food; for if they be continued on a kind too succulent or too dry, the effects are quickly perceived upon their constitutions. When fed upon recent vegetables, they seldom drink. But it often happens that, conducted by nature, they seek drier food, when the former disagrees with them. They then gnaw cloths, paper, or whatever of this kind they meet with; and, on these occasions, they are seen to drink like most other animals, which they do by lapping. They are chiefly fond of new milk; but, in case of necessity, are contented with water.

They move pretty much in the manner of rabbits, though not near so swiftly; and when confined in a room, seldom cross the floor, but generally keep along the wall. The male usually drives the female on before him, for they never move abreast together; but constantly the one seems to tread in the footsteps of the preceding. They chiefly seek for the darkest recesses, and the most intricate retreats; where, if hay be spread as a bed for them, they continue to sleep together, and seldom venture out but when they suppose all interruption removed. On those occasions they act as rabbits; they swiftly move forward from their bed, stop at the entrance, listen, look round, and if they perceive the slightest approach of danger, they run back with precipitation. In very cold weather, however, they are more active, and run about in order to keep themselves warm.

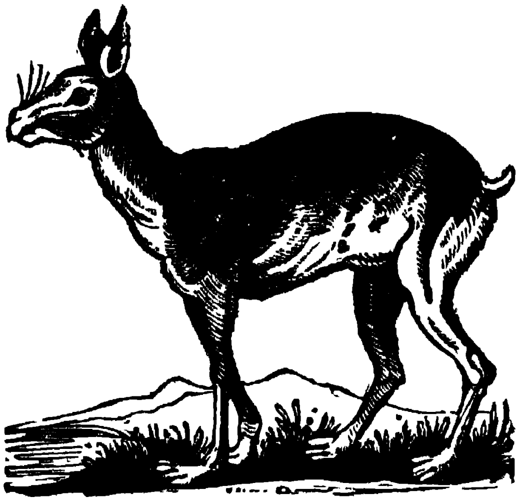
They are a very cleanly animal, and very different from that whose name they go by. If the young ones happen to fall into the dirt, or be any other way discomposed, the female takes such an aversion to them, that she never permits them to visit her more. Indeed, her whole employment, as well as that of the male, seems to consist in smoothing their skins, in disposing their hair, and improving its gloss. The male and female take this office by turns; and when they have brushed up each other, they then bestow all their concern upon their young, taking particular care to make their hair lie smooth, and biting them if they appear refractory. As they are so solicitous for elegance themselves, the place where they are kept must be regularly cleaned, and a new bed of hay provided for them at least every week. Being natives of a warm climate, they are naturally chilly in ours: cleanliness, therefore, assists warmth, and expels moisture. They may be thus reared, without the aid of any artificial heat; but, in general, there is no keeping them from the fire in winter, if they be once permitted to approach it.

(g) This history is partly taken from the Amœnitates Academicæ, vol. iv. p. 202.

When they go to sleep, they lie flat on their bellies, pretty much in their usual posture; except that they love to have their fore feet higher than their hinder. For this purpose, they turn themselves several times round before they lie down, to find the most convenient situation. They sleep, like the hare, with their eyes half open; and continue extremely watchful, if they suspect danger. The male and female are never seen both asleep at the same time; but while he enjoys his repose, she remains upon the watch, silently continuing to guard him, and her head turned towards the place where he lies. When she supposes that he has had his turn, she then awakes him with a kind of murmuring noise, goes to him, forces him from his bed, and lies down in his place. He then performs the same good turn for her; and continues watchful till she also has done sleeping.

These animals are exceedingly salacious, and generally are capable of coupling at six weeks old. The female never goes with young above five weeks; and usually brings forth from three to five at a time; and this not without pain. But what is very extraordinary, the female admits the male the very day she has brought forth, and becomes again pregnant: so that their multiplication is astonishing. She suckles her young but about twelve or fifteen days; and during that time does not seem to know her own: for if the young of any other be brought, though much older, she never drives them away, but suffers them even to drain her, to the disadvantage of her own immediate offspring. They are produced with the eyes open, like all others of the hare kind; and in about twelve hours, equal even to the dam in agility. Although the dam has but two teats, yet she abundantly supplies them with milk: and they are also capable of feeding upon vegetables, almost from the very beginning. If the young ones are permitted to continue together, the stronger, as in all other societies, soon begins to govern the weak. Their contentions are often long and obstinate; and their jealousies very apparent. Their disputes are usually for the warmest place, or the most agreeable food. If one of them happens to be more fortunate in this respect than the rest, the strongest generally comes to dispossess it of its advantageous situation. Their manner of fighting, though terrible to them, is ridiculous enough to a spectator. One of them seizes the hair on the nape of the others neck with its fore teeth, and attempts to tear it away; the other, to retaliate, turns its hinder parts to the enemy, and kicks up behind like a horse, and with its hinder claws scratches the sides of its adversary; so that sometimes they cover each other with blood. When they contend in this manner, they gnash their teeth pretty loudly; and this is often a denunciation of mutual resentment.

These, though so formidable to each other, yet are the most timorous creatures upon earth, with respect to the rest of animated nature; a falling leaf disturbs them, and every animal overcomes them. From hence they are with difficulty tamed; and will suffer none to approach them, except the person by whom they are fed. Their manner of eating is something like that of the rabbit; and, like it, they appear also to chew the cud. Although they seldom drink, they make water every minute. They grunt somewhat like a young pig; and have a more piercing note to express pain. In a word, they do no injury; but then, except the pleasure they afford to the spectator, they are of very little benefit to mankind. Some, indeed, dress and eat them; but their flesh is indifferent food, and by no means a reward for the trouble of rearing them. This, perhaps, might be improved, by keeping them in a proper warren, and not suffering them to become domestic: however, the advantages that would result from this, would be few, and the trouble great; so that it is likely they will continue a useless, inoffensive dependant, rather propagated to satisfy caprice than supply necessity.*



(Patagonian Cavy.)

* **The Patagonian Cavy.**—The Agouti des patagoni, is described at considerable length by D'Azara, in his valuable Essay on the Natural History of Paraguay. He informs us that this agouti is not precisely known among the natives of that place; but that he has seen and caught many of them between the thirty-fourth and thirty-fifth degrees of south latitude, in the territory of Pampas, to the south of Buenos Ayres. The domicile of the animal extends over the entire country of the Patagonians.

The people of this region call it a hare; but it is more fleshy and larger than the hare of Spain, and differs from it also very materially even in the taste of its flesh. Two of the Pampa hares, a male and a female, are almost invariably found together, and they run with a wonderful degree of force and velocity, for a little time; but they are speedily fatigued, and a well mounted horseman can overtake and catch them with very great facility. This is generally performed either by entangling them in a net, or striking them with a ball. The voice of this animal heard during the night, has a very singular, and by no means an agreeable, effect; it is a loud, sharp, and unpleasant cry, which may be thus expressed, *o, o, o, y:* when taken, it also cries in the same manner. The independent Indians eat its white flesh, as likewise do the labouring people among the Spanish South-Americans. When taken young, they are easily tamed, will suffer themselves to be scratched and patted, receive bread from the hand, eat of every thing, are suffered to quit the house with impunity and will return to it with equal freedom. Their length is about thirty inches; the tail an inch and a half, without hair, thick, and as hard as a piece of wood; it is capable of motion, cylindrical and truncated, and slightly curved towards its origin.

What is most remarkable, in the fur, is a white and narrow band, which, commencing on one of the haunches, proceeds to the other, round by the tail; the hair on the body is of a dusky cast. D'Azara has seen carpets of this hair, and they are much esteemed for their softness, and the agreeable effect they produce on the eye.—Shaw.

CHAP. XV.

ANIMALS OF THE RAT KIND.*

(Rat and Young.)

WERE it necessary to distinguish animals of the rat kind from all others, we might describe them as having two large cutting teeth, like the hare kind, in each jaw; as covered with hair; and as not ruminating. These distinctions might serve to guide us, had we not too near an acquaintance with this noxious race to be mistaken in their kind. Their numbers, their minuteness, their vicinity, their vast multiplication, all sufficiently contribute to press them upon our obervation, and remind us of their existence. Indeed, if we look through the different ranks of animals, from the largest to the smallest, from the great elephant to the diminutive mouse, we shall find that we suffer greater injuries from the contemptible meanness of the one, than the formidable invasions of the other. Against the elephant, the rhinoceros, or the lion, we can oppose united strength; and by art make up the deficiencies of natural power: these we have driven into their native solitudes, and obliged to continue at a distance, in the most inconvenient regions and unhealthful climates. But it is otherwise with the little teasing race I am now describing: no force can be exerted against their unresisting timidity; no arts can diminish their amazing propagation: millions may be at once destroyed, and yet the breach be repaired in the space of a very few weeks; and, in proportion as Nature has denied them force, it has supplied the defect by their fecundity.

THE GREAT RAT.—Of these, the animal best known at present, and in every respect the most mischievous, is the Great Rat; which, though but a new comer into this country, has taken too secure a possession to be ever removed. This hateful and rapacious creature, though sometimes called the Rat of Norway, is utterly unknown in all the northern countries, and, by the best accounts I can learn, comes originally from the Levant. Its first arrival, as I am assured, was upon the coasts of Ireland, in those ships that traded in provisions to Gibraltar; and perhaps we owe to a single pair of these animals, the numerous progeny that now infests the whole extent of the British empire.†

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* ANIMALS OF THE RAT KIND.—These have the upper front teeth wedge-shaped, three grinders on each side in each jaw, though sometimes only two, and have perfect collar bones. In Turton's Linne, forty-six species are described, besides varieties.

† THE SURMULOT.—This rat came from the southern regions of Asia, and its instinct has established it more completely among us than we could have ever done by our intelligence. Vain efforts, indeed, are daily made to naturalize in our climate, species that might be useful, and which seem to require much less for that purpose than this animal, whose wants are numerous. Notwithstanding this, it has been introduced and multiplied among us, in spite of every natural difficulty. Its multiplication is at present so great, that it is impossible effectually to oppose its encroachments and ravages. Towards the middle of the 16th century, they were observed for the first time in the neighbourhood of Paris, and M. F. Cuvier assures us that in some departments of France, they are yet unknown. Pallas tells us that they arrived at Astracan in the autumn of 1727, in such numbers, and in so short a time, that nothing could be done to oppose them. They came from the western desert, and transversed the waves of the Volga, which unquestionably must have swallowed up a part of their horde. They have not advanced any farther north, and are not to be found in Siberia.

THE COMMON RAT.—This and the surmulot, or brown rat, appears not to be aboriginal in Europe. Nothing indicates any knowledge of this animal among the ancients, and the more modern authors who have spoken clearly on the subject, go no further back than the sixteenth century. Some naplaced close together, being very small, and seeming scarce separated; so that with respect to this part of its formation, the animal has some resemblance to the viper. However, it is a very harmless, little creature, doing scarce any injury. On the contrary, as it lives chiefly in the fields, and feeds more upon insects than corn, it may be considered rather as a friend than an enemy. It has a strong disagreeable smell, so that the cat, when it is killed, will refuse to eat it. It is said to bring four or five young at a time.*

(Muscardin Mouse.)

THE DORMOUSE.—These animals may be distinguished into three kinds: the *greater dormouse*, which Buffon calls the Loir; the *middle*, which he calls the Lerot; the *less*, which he denominates the Muscardin. They differ from each other in size, the largest being equal to a rat, the least being no bigger than a mouse.

They inhabit woods or very thick hedges, forming their nests in the hollow of some tree, or near the bottom of a close shrub, humbly content with continuing at the bottom, and never aspiring to sport among the branches. Towards the approach of the cold season they form a little magazine of nuts, beans, or acorns; and, having laid in their hoard, shut themselves up with it for the winter. As soon as they feel the first advances of the cold, they prepare to lessen its effect, by rolling themselves up in a ball, and thus exposing the smallest surface to the weather. But it often happens that the warmth of a sunny day, or an accidental change from cold to heat, thaws their nearly stagnant fluids, and they revive. On such occasions they have their provisions laid in, and they have not far to seek for their support. In this manner they continue usually asleep, but sometimes waking, for above five months in the year, seldom venturing from their retreats, malady often expelling another.* It has become so scarce, that I do not remember ever to have seen one. It is said to be possessed of all the voracious and unnatural appetites of the former; though, as it is less, they may probably be less noxious. To this also we may subjoin the black water rat, about the same size with the latter, with a larger head, a blunter nose, less eyes, and shorter ears, and the tip of its tail a little white. It was supposed by Ray to be web-footed; but this has been found to be a mistake, its toes pretty much resembling those of its kind. It never frequents houses; but is usually found on the banks of rivers, ditches, and ponds, where it burrows and breeds. It feeds on fish, frogs, and insects; and in some countries it is eaten on fasting days.

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* THE ECONOMIC CAMPAGNOL. — The length of this animal is about four inches. It is found in various parts of Siberia and Khamtschatka, where they make their burrows. The migration of these quadrupeds have been noticed by Dr. Grieve and Pennant. "In the spring," says the former writer, "they assemble in amazing numbers, and proceed in a direct course westward, swimming with the utmost intrepidity over rivers, lakes, and even arms of the sea. Many are drowned, and many are destroyed by water fowl or rapacious fish. Those that escape, on emerging from the water, rest awhile to bask, dry their fur, and refresh themselves. The Khamtschatdales, who have a kind of superstitious veneration for these little animals, whenever they find any of them on the banks of the rivers, weak and exhausted, render them every possible assistance. As soon as they have crossed the river Penschinska, at the head of the gulph of the same name, they turn in a south westernly direction; and about the middle of July, generally reach the rivers Ochetska and Judoma, a distance of about a thousand miles! The flocks are also so numerous, that travellers have waited about two hours for them to pass. The retirement of these animals is considered by the Khamtschatdales as a serious misfortune; but their return occasions the utmost joy and festivity, a successful chase and fishery being always considered as its certain consequence."

Kerr informs us, that the Khamtschatdales never destroy the hoards of these rats. Sometimes, indeed, they take away part of their store; but in return for this, they invariably leave some caveare, or other food, to support them in its stead.

MANNER OF CROSSING RIVERS. — The manner in which the economic campagnol on their foraging excursions cross the rivers of Iceland, is thus described by Olaffen: "The party, consisting of from six to ten, select a flat piece of dried cow-dung, on which they place the berries they collected in a heap on the middle. Then with their united force, drawing it to the water's edge, they launch it, and embark; placing themselves round the heap, with their heads joined over it, and their backs to the water, their tails pendent in the stream, serving the purpose of rudders."

(Mouse.)

THE MOUSE.—An animal equally mischievous, and equally well known with the former, is the mouse. Timid, cautious, and active, all its dispositions are similar to those of the rat, except with fewer powers of doing mischief. (*g*) Fearful by nature, but familiar from necessity, it attends upon mankind, and comes an unbidden guest to his most delicate entertainments. Fear and necessity seem to regulate all its motions; it never leaves its hole but to seek provision, and seldom ventures above a few paces from home. Different from the rat, it does not go from one house to another, unless it be forced; and, as it is more easily satisfied, it does much less mischief.†

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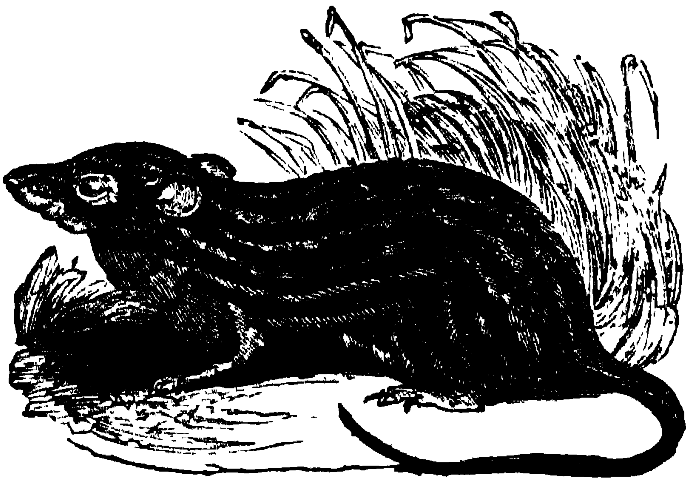
* Anecdote.—Dr. Shaw in his general Zoology, informs us, that a gentleman travelling through Mecklenburg, about thirty years ago, was witness to the following curious circumstance in the post house at New Stargard. After dinner, the landlord placed on the floor a large dish of soup, and gave a loud whistle Immediately there came into the room a mastiff, a fine Angora cat, an old raven, and a remarkably large rat with a bell about its neck. The four animals went to the dish, and without disturbing each other, fed together; after which the dog, cat, and rat, lay before the fire, while the raven hopped about the room. The landlord after accounting for the familiarity which existed among the animals, informed his guest that the rat was the most useful of the four, for the noise he made had completely freed the house from the rats and mice with which it was before infested.

Destruction of Rats.—Rats are effectually banished by sprinkling chloride of lime in their haunts.—Mirror.

† Barbary Mouse.—(*Mus Barbara*) — Less than the common mouse: of a brown colour: marked on the back with ten slender streaks: three toes with claws on the fore feet, with the rudiments of a thumb: tail of the length of the body. Inhabits Barbary. —Pennant.


(Barbary Mouse.)

French Mice.—A variety of the mouse kind many of our readers have seen in the streets of London; shown about by the Savoyards, of a milk white colour, with red eyes. We merely allude to this variety, which both in size and disposition does not differ from the common coloured sort, to state, that attempts at domesticating the kind on this side of the channel have proved abortive, from the hostility, (we believe), generally manifested by our native mice to the elegant little stranger. As it is, they answer an innocent and in one sense, useful end, in earning for their adventurous protectors, a subsistence by the gratuities of the curious and humane.—Ed.

(*g*) Buffon, vol. xv. p. 145.

Almost all animals are tamed more difficultly in proportion to the cowardice of their natures. The truly bold and courageous easily become familiar, but those that are always fearful are ever suspicious. The mouse being the most feeble, and consequently the most timid of all quadrupeds, except the guinea-pig, is never rendered thoroughly familiar; and, even though fed in a cage, retains its natural apprehensions. In fact, it is to these alone that it owes its security. (*g*) No animal has more enemies, and few so incapable of resistance. The owl, the cat, the snake, the hawk, the weasel, and the rat itself, destroy this species by millions, and it only subsits by its amazing fecundity.

The mouse brings forth at all seasons, and several times in the year. Its usual number is from six to ten.* These in less than a fortnight are strong enough to run about and shift for themselves. They are chiefly found in farmer's yards and among their corn, but are seldom in those ricks that are much infested with rats. They generally choose the south-west side of the rick, from whence most rain is expected; and from thence they often, of an evening, venture forth to drink the little drops either of rain or dew that hang at the extremities of the straw. (*g*)

(Long-tailed Field-mouse.)

To this species, merely to avoid teasing the reader with a minute description of animals very inconsiderable and very nearly alike, I will add that of the *long-tailed field-mouse*, which is larger than the former, of a colour very nearly resembling the Norway rat, and chiefly found in fields and gardens. They are extremely voracious, and hurtful in gardens and young nurseries, where they are killed in great numbers. However, their fecundity quickly repairs the destruction.

* THE FECUNDITY OF MICE. – An extraordinary instance of the rapid increase of mice, and of the injury they sometimes do, occured a few years ago in the new plantations, made by order of the Crown, in the Forest of Dean, Gloucestershire, and in the New Forest, Hampshire. Soon after the formation of these plantations, a sudden and rapid increase of mice took place in them, which threatened destruction to the whole of the young plants. Vast numbers of these were killed,—the mice having eaten through the root of five years old oaks and chestnuts, generally just below the surface of the ground. Hollies also, which were five and six feet high, were barked round the bottom, and in some instances the mice had crawled up the tree, and were even feeding on the bark of the upper branches. In the reports made to Government on the subject, it appears that the roots had been eaten through wherever they obstructed the run of the mice, but that the bark of the trees constituted their food. This was ascertained by confining a number of the mice in cages, and supplying them with the fresh roots and bark of trees, whence it was found that they fed greedily on the latter, and left the roots untouched. Various plans were devised for their destruction; traps were set, poison laid, and cats turned out, but nothing appeared to lessen their numbers. It was at last suggested, that if holes were dug into which the mice might be enticed or fall, their destruction might be effected. Holes, therefore, were made, about twenty yards asunder, in some of the Dean Forest Plantations, being about twelve in each acre of ground. These holes were from eighteen to twenty inches in depth, and two feet one way, and a half the other, and they were much wider at the bottom than the top, being excavated hollow under, so that the animal, when once in, could not easily get out again. In these holes, at least 30,000 mice were caught in the course of three or four months, that number having been counted out and paid for by the proper officers of the forest. It was however calculated, that a much greater number of mice than these were taken out of the holes, after being caught, by stoats, weasels, kites, hawks and owls, and also by crows, jays, and magpies.

(*g*) E volucribus hirundines sunt indociles, e terrestribus mures.- -PLIN.

(*g*) Buffon, vol. xv. p. 147.

Nearly resembling the former, but larger, (for it is six inches long) is the *short-tailed field-mouse;* which, as its name implies, has the tail much shorter than the former, it being not above an inch and a half long, and ending in a small tuft. Its colour is more inclining to that of the domestic mouse, the upper part being blackish, and the under of an ash colour. This, as well as the former, are remarkable for laying up provision against winter; and Buffon assures us they sometimes have a store of above a bushel at a time.*

We may add also the *shrew-mouse* to this species of minute animals, being about the size of the domestic mouse, but differing greatly from it in the form of its nose, which is very long and slender. The teeth also are of a very singular form, and twenty-eight in number; whereas the common number in the rat kind is usually not above sixteen. The two upper fore-teeth are very sharp, and on each side of them there is a kind of wing or beard, like that of an arrow, scarce visible but on a close inspection. The other teeth are

(Shrew-mouse.)

As the mice increased, so did the birds of prey, of which at last there were an incredible number. In New Forest, from the weekly reports of the deputy surveyor of the forest, about the same number were destroyed, allowing the same calculation for those eaten by vermin: and in addition to which, it should be mentioned, that these mice were found to eat each other when their food fell short in winter. Putting these circumstances together, the total destruction of mice in the two forests, would probably amount to more than 200,000.—Jesse's Gleanings.

* The Harvest Mouse.—This is probably the smallest of British quadrupeds, the body not exceeding two inches and a quarter in length; the weight is said to be about one sixth of an ounce. Mr. White in his history of Selborne, (a sort of work well worthy of imitation, particularly by the clergy and others, who, with the blessings of a liberal education, possess the means of local observation,) first made the species known to the public, nor indeed have we any other original account of it:—

"These mice are much smaller and more slender than the *Mus domesticus medius* of Ray, and have more of the squirrel or dormouse colour. They never enter into houses; are carried into ricks and barns with the sheaves: abound in harvest, and build their nest amidst the straws of corn above the ground, and sometimes in thistles. They breed as many as eight at a litter, in a little brown nest, composed of blades of grass and wheat. The nest is most artificially platted, perfectly round, and about the size of a cricket ball, with the aperture so ingeniously closed, that there is no discovering to which part it belongs. It is so compact and well fitted, that it will roll across a table without being discomposed, though it contained eight little mice, which are naked and blind. As the nest is perfectly full, how could the dam come at her litter respectively, so as to administer a teat to each? Perhaps she opens different places for that purpose, adjusting them again when the business is over; but she could not possibly be contained in the ball with her young, which moreover, would be daily increasing in bulk."—Natural History of Selborne.

(Harvest Mouse.)

This animal, which is called by Buffon the Surmulot, is in length about nine inches; its eyes are large and black; the colour of the head, and the whole upper part of the body, is of a light brown, mixed with tawny and ash colour. The end of the nose, the throat and belly, are of a dirty white, inclining to a grey; the feet and legs are almost bare, and of a dirty, pale, flesh colour; the tail is as long as the body, covered with minute dusky scales, mixed with a few hairs, and adds to the general deformity of its detestable figure. It is chiefly in the colour that this animal differs from the black rat, or the common rat, as it was once called; but now common no longer. This new invader, in a very few years after its arrival, found means to destroy almost the whole species, and to possess itself of their retreats.

But it was not against the black rat alone that its rapacity was directed; all other animals of inferior strength shared the same misfortunes. The contest with the black rat was of short continuance. As it was unable to contend, and had no holes to fly to for retreat, but where its voracious enemy could pursue, the whole race was soon extinguished. The frog also was an animal equally incapable of combat or defence. It had been designedly introduced into the kingdom of Ireland some years before the Norway rat; and it was seen to multiply amazingly. The inhabitants were pleased with the propagation of a harmless animal, that served to rid their fields of insects; and even the prejudices of the people were in its favour, as they supposed that the frog contributed to render their waters more wholesome. But the Norway rat soon put a stop to their increase; as these animals were of an amphibious nature, they pursued the frog to its lakes and took it even in its own natural element. I am, therefore, assured, that the frog is once more almost extinct in that kingdom; and that the Norway rat, having no more enemies left there to destroy, is grown less numerous also.

We are not likely, therefore, to gain by the destruction of our old domestics, since they are replaced by such mischievous successors. The Norway rat has the same disposition to injure us, with much greater power of mischief. It burrows in the bank of rivers, ponds, and ditches; and is every year known to do incredible damage to those mounds that are raised to conduct streams, or to prevent rivers from overflowing. In these holes, which it forms pretty near the edge of the water, it chiefly resides during the summer, where it lives upon small animals, fish, and corn. At the approach of winter, it comes nearer the farm houses; burrows in their corn, eats much, and damages still more than it consumes. But nothing that can be eaten, seems to escape its voracity. It destroys rabbits, poultry, and all kinds of game; and, like the polecat, kills much more than it can carry away. It swims with great ease, dives with great celerity, and easily thins the fish pond. In short, scarce any of the feebler animals escape its rapacity, except the mouse, which shelters itself in its little hole, where the Norway rat is too big to follow.

These animals frequently produce from fifteen to thirty at a time; (g) and usually bring forth three times a year.

To this species I will subjoin as a variety, the black rat, mentioned above, greatly resembling the former in figure, but very distinct in nature, as appears from their mutual antipathy. This animal was formerly as mischievous as it was common; but at present it is almost utterly extirpated by the great rat, one

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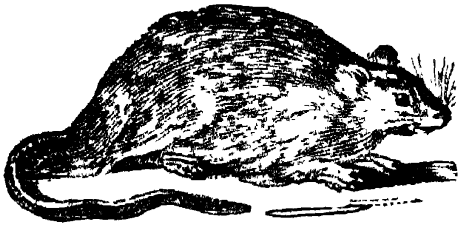
turalists think with Linnæus and Pallas, that we have received it from America, and others believe that it is a present of our own to that country, made after we had ourselves received it from the eastern regions. It is certain that the rat is to be found in all the temperate climates of the globe: that it is wonderfully common in Persia, and multiplied to a prodigious extent in the western islands, where it is not obliged by winter to seek a refuge in the habitations of man, but where the fields during the entire year present it with abundance of nutriment. In all this part of America, accordingly, it has become a perfect scourge, from its ravages and devastations. In fact, the rat consumes an immense quantity of provisions, and destroys or damages still more than it consumes, particularly in the fields, as it cuts up from the roots, plants of which it eats but a portion.

(g) Buffon, vol. xvii. p. 2.

and consequently but rarely seen.* Their nests are lined with moss, grass and dead leaves; they usually bring forth three or four young at a time, and that but once a year, in the spring.†


(Musk Rat)

THE MUSK RAT.—Of these animals of the rat kind, but with a musky smell, there are also three distinctions, as of the former; the Ondatra, the Desman, and the Pilori. The Ondatra is a native of Canada, the Desman of Lapland, and the Pilori of the West-India islands. The ondatra differs from all others of its kind, in having the tail flatted and carried edgeways. The desman has a long extended snout like the shrew-mouse; and the pilori a short tail, as thick at one end as the other. They all resemble each other in being fond of the water, but particularly in that musky odour from whence they have taken their name.

Of these, the ondatra is the most remarkable, and has been the most minutely described. (*g*) This animal is about the size of a small rabbit, but has the hair, the colour, and the tail of a rat, except that it is flatted on the sides, as mentioned above. But it is still more extraordinary upon other accounts, and different from all other animals whatever. It is so formed that it can contract and enlarge its body at pleasure. It has a muscle like that of horses, by which they move their hides, lying immediately under the skin, and that furnished with such a power of contraction, together with such an elasticity in the false ribs, that this animal can creep into a hole where others, seemingly much less, cannot follow. The female is remarkable also for two distinct apertures, one for urine, the other for propagation. The male is equally observable for a peculiarity of conformation; the musky smell is much stronger at one particular season of the year than any other; and the marks of the sex seem to appear and disappear in the same manner.

The ondatra in some measure resembles the beaver in its nature and disposition. They both live in society during winter; they both form houses of two feet and a half wide, in which they reside several families together. In these they do not assemble to sleep as the marmot, but purely to shelter themselves from the rigour of the season. However, they do not lay up magazines of provision like the beaver; they only form a kind of covert way to and round their dwelling, from whence they issue to procure water and roots, upon which they subsist. During winter their houses are covered under a depth of eight or ten feet of snow; so that they must lead but a cold, gloomy, and a necessitous life, during its continuance. During summer they separate two by two, and feed upon the variety of roots and vegetables that the season offers. They then become extremely fat, and are much sought after, as well for their flesh as their skins, which are very valuable.[*] They then also acquire a very strong scent of musk, so pleasing to an European, but which the savages of Canada cannot abide. What we admire as a perfume, they consider as a most abominable stench, and call one of their rivers, on the banks of which this animal is seen to burrow in numbers, by the name of the stinking river, as well as the rat itself, which is denominated by them the stinkard. This is a strange diversity among mankind; and, perhaps, may be ascribed to the different kinds of food among different nations. Such as chiefly feed upon rancid oils and putrid flesh, will often mistake the nature of scents; and, having been long used to ill smells, will by habit consider them as perfumes. Be this as it will, although these nations of northern savages consider the musk rat as intolerably fœtid, they nevertheless regard it as very good eating; and, indeed, in this they imitate the epicures of Europe very exactly, whose taste seldom relishes a dish till the nose gives the strongest marks of disapprobation. As to the rest, this animal a good deal resembles the beaver in its habits and disposition; but, as its instincts are less powerful, and its economy less exact, I will reserve for the description of that animal a part of what may be applicable to this.

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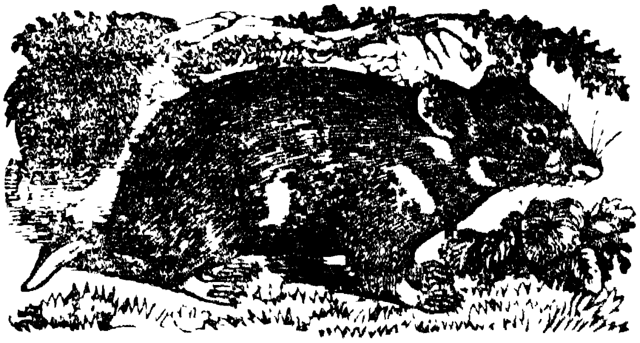
* **Periodical Lethargy.**—A. M. Mangili, of Pavia, has published his observations on the periodical lethargy of this species in particular, among lethargic quadrupeds. His hypothesis is, that the arterial blood necessary to excite and revive the fibres of the cerebral organ, flows less copiously to this organ in the hybernating animals, on account of the small number of the arteries he had found in such animals, and of the smallness of their calibre; these concurring with other exterior causes of debility, diminishes the energy of the fibres of the brain, and produces at first sleep and eventually, continued lethargy.—Transactions Royal Society.

† **The Fat Dormouse.**—This species is still used for food in Italy, and is taken simply by preparing a fit place for its winter quarters in the wood, which is large enough for many of them to retire to, whence they are taken toward the end of Autumn. The Romans were very fond of them as food; they kept and fattened them for the table in receptacles called Gliraria. Martial tells us that they are fattest after hybernating, when they have had nothing but sleep to fatten on; on which Buffon observes, that the Loir, at all times fat, keeps itself in condition in winter by waking occasionally, and taking food at intervals.

(g) Buffon, vol xx p 4.


(Hamster.)

THE CRICETUS.—The cricetus, or German rat, which Buffon calls the Hamster, greatly resembles the water-rat in its size, small eyes, and the shortness of its tail. It differs in colour, being rather browner, like the Norway rat, with the belly and legs of a dirty yellow. But the marks by which it may be distinguished from all others, are two pouches, like those of a baboon, on each side of its jaw, under the skin, into which it can cram a large quantity of provision. These bags are oblong, and of the size, when filled, of a large walnut. They open into the mouth, and fall back along the neck to the shoulder. Into these the animal can thrust the surplus of those fruits or grains it gathers in the fields, such as wheat, peas, or acorns. When the immediate calls of hunger are satisfied, it then falls to filling these; and thus, loaded with two great bunches on each side of the jaw, it returns home to its hole to deposit the spoil as a store for the winter. The size, the fecundity, and the voraciousness of this animal render it one of the greatest pests in the countries where it is found, and every method is made use of to destroy it.

But, although this animal is very noxious with respect to man, yet, considered with regard to those instincts which conduce to its own support and convenience, it deserves our admiration. (*g*) Its hole offers a very curious object for contemplation, and shows a degree of skill superior to the rest of the rat kind.* It consists of a variety of apartments fitted up for the different occasions of the little inhabitant. It is generally made on an inclining ground, and always has two entrances, one perpendicular and the other oblique; though, if there be more than one in a family, there are as many perpendicular holes as there are individuals below. The perpendicular hole is usually that through which they go in and out: the oblique serves to give a thorough air to keep the retreat clean, and, in case one hole is stopped, to give an exit at this. Within about a foot of the perpendicular hole, the animal makes two more, where are deposited the family's provisions. These are much more spacious than the former, and are large in proportion to the quantity of the store. Beside these, there is still another apartment warmly lined with grass and straw, where the female brings forth her young; all these communicate with each other, and all together take up a space of ten or twelve feet in diameter. These animals furnish their storehouses with dry corn well cleaned; they also lay in corn in the ear, and beans and peas in the pod. These, when occasion requires, they afterwards separate, carrying out the pods and empty ears by their oblique passage. They usually begin to lay in at the latter end of August; and, as each magazine is filled, they carefully cover up the mouth with earth, and that so neatly that it is no easy matter to discover where the earth has been removed. The only means of finding out their retreats are, therefore, to observe the oblique entrance, which generally has a small quantity of earth before it; and this, though often several yards from their perpendicular retreat, leads those who are skilled in the search to make the discovery. Many German peasants are known to make a livelihood by finding out and bringing off their hoards, which, in a fruitful season, often furnish two bushels of good grain in each apartment.

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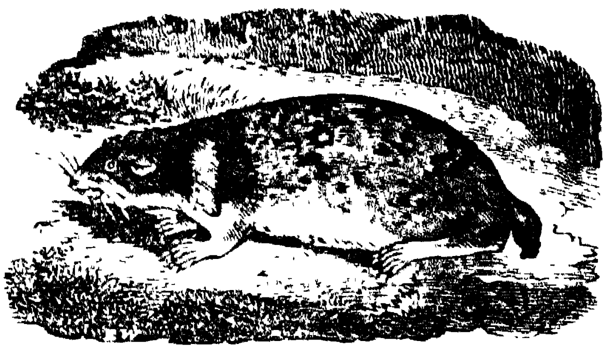
[*] THE MUSK RAT. — The Indians kill these animals by spearing them through the walls of their houses, making their approach with great caution, for the Musquashes take to the water when alarmed by a noise on the ice. An experienced hunter is so well acquainted with the direction of the chamber, and the position in which its inmates lie, that he can transfix four or five at a time. As soon as, from the motion of the spear, it is evident that an animal is struck, the house is broken down, and it is taken out. The Musquash is a watchful, but not a very shy animal. It will come very near to a boat or canoe, but dives instantly on perceiving the flash of a gun. It may be frequently seen sitting on the shores of small muddy islands, in a rounded form, and not easily to be distinguished from a piece of earth, until on the approach of danger, it suddenly plunges into the water. In the act of diving, when surprised, it gives a smart blow to the water with its tail. Hearne states that it is easily tamed, soon grows fond, is very cleanly and playful, and smells pleasantly (!) of musk.

The fur of this animal is used in the manufacture of hats. Between four and five hundred thousand skins are annually imported into Great Britain from North America. - RICHARDSON'S NORTH AMERICAN ZOOLOGY.

Like most others of the rat kind, they produce twice or thrice a year, and bring five or six at a time.


(Lemming.)

THE LEMMING.—Having considered various kinds of these noxious little animals that elude the indignation of mankind, and subsist by their number, not their strength, we come to a species more bold, more dangerous, and more numerous than any of the former. The lemming, which is a native of Scandinavia, is often seen to pour down in myriads from the northern mountains, and, like a pestilence, destroy all the productions of the earth. It is described as being larger than a dormouse, with a bushy tail, though shorter. It is covered with thin hair of various colours. The extremity of the upper part of the head is black, as are likewise the neck and shoulders, but the rest of the body is reddish, intermixed with small black spots of various figures, as far as the tail, which is not above half an inch long. The eyes are little and black, the ears round and inclining towards the back, the legs before are short, and those behind longer, which gives it a great degree of swiftness. But what it is much more remarkable for than its figure are, its amazing fecundity and extraordinary migrations.

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* **Instinct and Intelligence.**—Nothing so greatly shows the power and extent of the resources of Nature, as the modes in which she supplies by instinct the want of intelligence, and puts a blind and necessary force in the place of judgment and reason. When this is done, we find those beings which are in reality the most stupid, appear to possess the most extensive intellectual faculties. They seem to approximate to man, to equal, nay, to surpass him in foresight and sagacity. What is most singular is, that these remarkable faculties are usually accompanied by organs the most limited, and physical qualities the most feeble. The circumstance, however, which separates instinct from intelligence, and gives to the latter the most decided superiority, is, that instinct is circumscribed to a small number of actions, out of the range of which it is absolutely nothing. But intelligence, on the contrary, always present, and always ready for action, extends itself to all circumstances, to all times, and to all places. With instinct the world is

(*g*) Buffon, vol. xxvi. p. 159.

In wet seasons, all of the rat kind are known to propagate more than in dry; but this species in particular is so assisted in multiplying by the moisture of the weather, that the inhabitants of Lapland, sincerely believe that they drop from the clouds, and that the same magazines that furnish hail and snow, pour the lemming also upon them.* In fact, after long rain, these animals set forward from their native mountains, and several millions in a troop deluge the whole plain with their numbers. (g) They move, for the most part, in a square, marching forward by night and lying still by day. Thus, like an animated torrent, they are often seen more than a mile broad covering the ground, and that so thick that the hindmost touches its leader. It is in vain that the poor inhabitant resists or attempts to stop their progress, they still keep moving forward: and, though thousands are destroyed, myriads are seen to succeed and make their destruction impracticable. They generally move in lines, which are about three feet from each other, and exactly parallel. Their march is always directed from the north-west to the south-east, and regularly conducted from the beginning. Wherever their motions are turned, nothing can stop them; they go directly forward, impelled by some strange power; and, from the time they first set out, they never once think of retreating. If a lake or a river happens to interrupt their progress, they all together take the water and swim over it; a fire, a deep well, or a torrent, does not turn them out of their straight-lined direction; they boldly plunge into the flames, or leap down the well, and are sometimes seen climbing up on the other side. If they are interrupted by a boat across a river while they are swimming, they never attempt to swim round it, but mount directly up its sides; and the boat-men, who know how vain resistance in such a case would be, calmly suffer the living torrent to pass over, which it does without further damage. If they meet with a stack of hay or corn that interrupts their passage, instead of going over it they gnaw their way through; if they are stopped by a house in their course, if they cannot get through it, they continue there till they die. If they are interrupted in their course, and a man should imprudently venture to attack one of them, the little animal is no way intimidated by the disparity of strength, but furiously flies up at its opponent, and, barking somewhat like a puppy, wherever it fastens does not easily quit the hold. If at last the leader be forced out of its line, which it defends as long as it can, and be separated from the rest of its kind, it sets up a plaintive cry different from that of anger, and, as some pretend to say, gives itself a voluntary death, by hanging itself on the fork of a tree.

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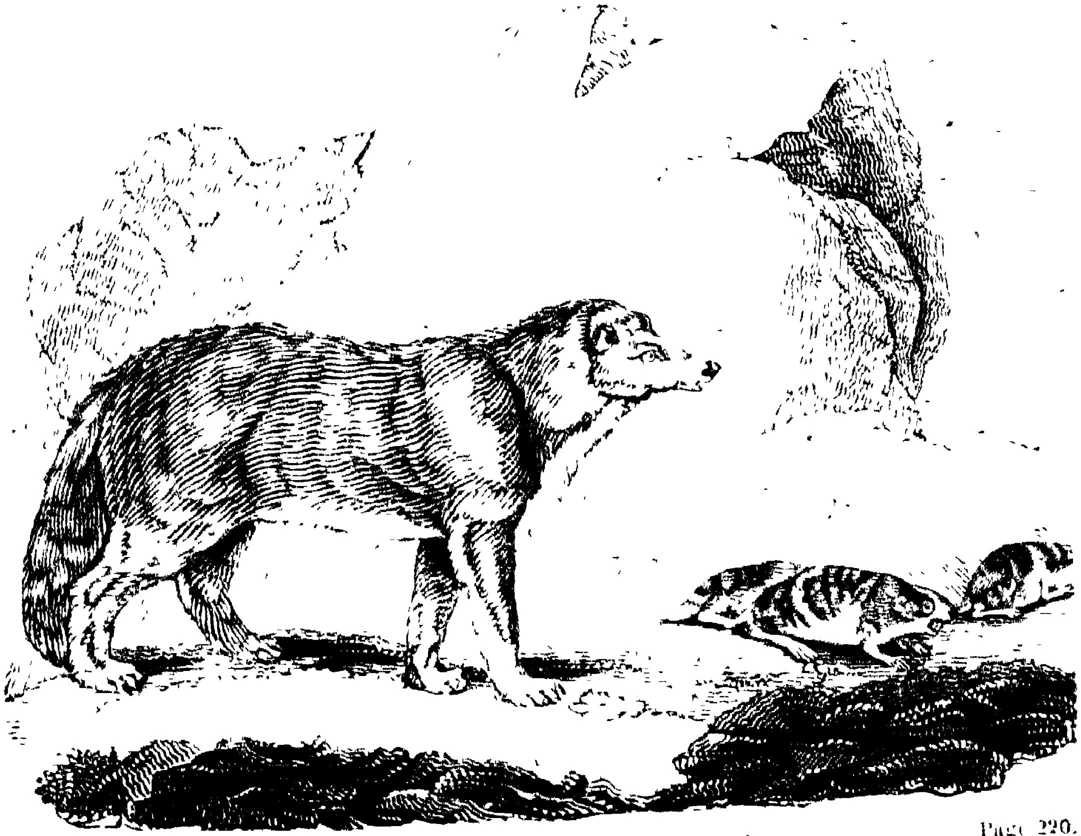
bounded to it alone, but the reign of intelligence extends beyond the dominion of the senses.

The hamster, presents a curious example of extended instinct and boundless intelligence. For man alone the future exists in the present. No other animal is capable of foresight, or of conforming his actions by anticipated knowledge to future contingencies. Other animals exist but in the present, and they appear in fact, to have little or no perception of time. The hamster lays in magazines more than its wants require, and thus it is enabled to wait the return of spring, and the maturity of the harvest. In other respects it is a stupid animal, altogether under the empire of circumstances in which it may be placed.—GRIFFITH.

* VULGAR CONJECTURE.—It was once believed that these animals fell from the clouds at particular seasons, and some have affirmed that they have seen a lemming in its descent; but an accident of this kind is easily accounted for, on the supposition of a lemming escaping now and then from the claws of some bird which had seized it, and thus falling to the ground; a circumstance which is said not unfrequently to take place when the animals are seized by crows, gulls, &c.—SHAW.

(g) Phil. Trans. vol. ii. p. 872.



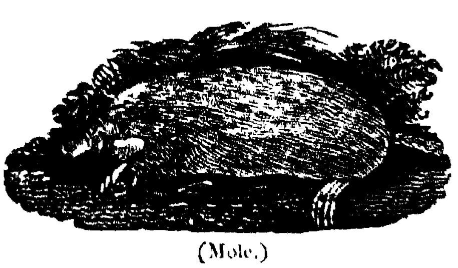
LEMMINGS AND THE ARTIC FOX

Page 220.

An enemy so numerous and destructive would quickly render the countries where they appear utterly uninhabitable, did it not fortunately happen that the same rapacity that animates them to destroy the labours of mankind, at last impels them to destroy and devour each other.(g) After committing incredible devastations, they are at last seen to separate into two armies, opposed with deadly hatred, along the coasts of the larger lakes and rivers. The Laplanders, who observe them thus drawn up to fight, instead of considering their mutual animosity as a happy riddance of the most dreadful pest, form ominous prognostics from the manner of their arrangement. They consider their combats as a presage of war, and expect an invasion from the Russians or the Swedes, as the sides next those kingdoms happen to conquer. The two divisions, however, continue their engagements and animosity until one party overcomes the other. From that time they utterly disappear, nor is it well known what becomes of either the conquerors or the conquered. Some suppose that they rush headlong into the sea, others that they kill themselves, as some are found hanging on the forked branches of a tree, and others still that they are destroyed by the young spring herbage. But the most probable opinion is, that, having devoured the vegetable productions of the country, and having nothing more to subsist on, they then fall to devouring each other; and, having habituated themselves to that kind of food, continue it. However this be, they are often found dead by thousands, and their carcasses have been known to infect the air for several miles round, so as to produce very malignant disorders. They seem also to infect the plants they have gnawed, for the cattle often die that afterwards feed in the places where they passed

As to the rest, the male is larger and more beautifully spotted than the female. They are extremely prolific, and what is extraordinary, their breeding does not hinder their march; for some of them have been observed to carry one young one in their mouth, and another on their back. They are greatly preyed upon by the ermine, and, as we are told even by the rein-deer. The Swedes and Norwegians, who live by husbandry, consider an invasion from these vermin as a terrible visitation; but it is very different with respect to the Laplanders, who lead a vagrant life, and who, like the lemmings themselves, if their provisions be destroyed in one part of the country, can easily retire to another. These are never so happy as when an army of lemmings come down amongst them; for then they feast upon their flesh; which though horrid food, and which, though even dogs and cats are known to detest, these little savages esteem very good eating, and devour greedily. They are glad of their arrival also upon another account, for they always expect a great plenty of game the year following, among those fields which the lemmings have destroyed.

THE MOLE —To these minute animals of the rat kind, a great part of whose lives is past in holes under ground, I will subjoin one little animal more, no way resembling the rat, except that its whole life is spent there. As we have seen some quadrupeds formed to crop the surface of the fields, and others to live upon the tops of trees, so the mole is formed to live wholly under the earth, as if Nature meant that no place should be left wholly untenanted.



(Mole.)

This animal, so well known in England, is, however, utterly a stranger in other places, and particularly in Ireland. For such, therefore, as have never seen it, a short description will be necessary And, in the first place, though somewhat of a size between the rat and the mouse, it no way resembles either, being an animal entirely of a singular kind, and perfectly unlike any other quadruped whatever. It is bigger than a mouse, with a coat of fine, short,

(g) Dictionnaire Raisonnée, vol. ii. p. 610.

glossy, black hair. Its nose is long and pointed, resembling that of a hog, but much longer. Its eyes are so small that it is scarce possible to discern them.* Instead of ears it has only holes in the place. Its neck is so short that the head seems stuck upon the shoulders. The body is thick and round, terminating by a very small, short tail, and its legs also are so very short, that the animal seems to lie flat on its belly. From under its belly, as it rests in this position, the four feet appear just as if they immediately grew out of the body. Thus the animal appears to us at first view as a mass of flesh covered with a fine, shining, black skin, with a little head, and scarce any legs, eyes, or tail. On a closer inspection, however, two little black points may be discerned, that are its eyes. The ancients, and some of the moderns, were of opinion that the animal was utterly blind; but Derham, by the help of a microscope, plainly discovered all the parts of the eye that are known in other animals, such as the pupil, the vitreous and the crystalline humours.† The fore-legs appear very short and strong, and furnished with five claws to each. These are turned outwards and backwards, as the hands of a man when swimming. The hind legs are longer and weaker than the fore, being only used to assist its motions; whereas the others are continually employed in digging. The teeth are like those of a shrew-mouse, and there are five on both sides of the upper jaw, which stand out; but those behind are divided into points. The tongue is as large as the mouth will hold.

The smallness of its eyes, which induced the ancients to think it was blind, is, to this animal, a peculiar advantage. A small degree of vision is sufficient for a creature that is ever destined to live in darkness. A more extensive sight would only have served to show the horrors of its prison, while Nature had denied it the means of an escape.

As the eye is thus perfectly fitted to the animal's situation, so also are the senses of hearing and smelling.* The first gives it notice of the most distant appearance of danger; the other directs it, in the midst of darkness, to its food. The wants of a subterraneous animal can be but few; and these are sufficient to supply them: to eat, and to produce its kind, are the whole employment of such a life; and for both these purposes it is wonderfully adapted by Nature (*g*)

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* **Blindness of the Mole**.—The Greeks, as has been generally assumed, described the mole as blind, an error which modern zoologists have piqued themselves in detecting; M. Olivier, however, has shown that this wonderful people, whose mental faculties shot forth as it were a meteor through the surrounding density, and anticipated the progress of human art and intellect by many tedious ages, were not so idle in their observations, or incautious in their conclusions. The *ασπαλαξ* of the Greeks was, doubtless, the animal now under consideration, which was indigenous in their country or around them, whereas the mole was an exotic in Greece. The Romans may, however bear the blame of having led us into this error, by rendering the word *ασπαλαξ* into *talpa*, and applying that word to the mole of Europe.—Griffith.

† **Vision of the Mole**.—Does the mole see? Aristotle and all the Greek philosophers, thought it blind. Galen, on the other hand, maintained that the mole saw. He affirmed that it has all the known means of sight. The question has been resumed in modern times. Naturalists have found the eye of the animal. It is very small—not larger than a millet seed; its colour is an ebony black; it is hard to the touch; and can scarcely be depressed by squeezing it between the fingers. Besides the eyelid which covers it, it is protected by long hairs, which crossing each other, form a thick and strong bandage. Such an eye ought to be destined to see. But anatomists do not find the optic nerve. What use could an eye be of, deprived of a nerve, which in other animals transmits the visual sensations to the brain? This consideration naturally tends to restore the opinion of Aristotle and the Greeks, and to induce the belief that the mole does not see, and that its eye is only a rudimental point, without use.

Direct experiments, however, made at the request of G. St. Hilaire, show most incontestibly that the mole makes use of its eyes, since it turns to avoid obstacles placed in its way. But if the mole sees, how is this accomplished without an optic nerve. M. Serres was of opinion that the place of this nerve was supplied by a superior branch of the fifth pair, analogous to the opthalmic branch of Willis.

According to Geoffroy St. Hilaire, this change of function in a nerve, which is not naturally destined to perform, does not exist. The mole sees by aid of a particular nerve, being unable, on account of the too great extension of the olfactory apparatus, to follow the direction which it takes in other animals, towards the tubercula quadrigemina, takes another direction, and anastomoses, in the nearest point (au plus pres,) with the nerve of the fifth pair.—Arcana of Science, 1832.

Thus admirably is this animal fitted for a life of darkness and solitude; with no appetites but what it can easily indulge, with no enemies but what it can easily evade or conquer. As soon as it has once buried itself in the earth, it seldom stirs out, unless forced by violent rains in summer, or when in pursuit of its prey, it happens to come too near the surface, and thus gets into the open air, which may be considered as its unnatural element. In general, it chooses the looser softer grounds, beneath which it can travel with greater ease; in such also it generally finds the greatest number of worms and insects, upon which it chiefly preys. It is observed to be most active, and to cast up most earth, immediately before rain; and, in winter, before a thaw: at those times the worms and insects begin to be in motion; and approach the surface, whither this industrious animal pursues them. On the contrary, in very dry weather, the mole seldom or never forms any hillocks; for then it is obliged to penetrate deeper after its prey, which at such seasons retire far into the ground.

As the moles very seldom come above ground, (*g*) they have but few enemies; and very readily evade the pursuit of animals stronger and swifter than themselves. Their greatest calamity is an inundation; which wherever it happens, they are seen, in numbers, attempting to save themselves by swimming, and using every effort to reach the higher grounds. The greatest part, however, perish, as well as their young, which remain in the holes behind. Were it not for such accidents, from their great fecundity, they would become extremely troublesome; and as it is, in some places, they are considered by the farmer as his greatest pest.† They couple towards the approach of spring: and their young are found about the beginning of May. They generally have four or five at a time; and it is easy to distinguish among other mole-hills, that in which the female has brought forth her young. These are made with much greater art than the rest; and are usually large. The female, in order to form this retreat, begins by erecting the earth into a tolerably spacious apartment, which is supported within by partitions, at proper distances, that prevent the roof from falling. All round this she works, and beats the earth very firm, so as to make it capable of keeping out the rain let it be never so violent. As the hillock in which this apartment is thus formed, is raised above ground, the apartment itself is consequently above the level of the plain, and, therefore, less subject to accidental slight inundations. The place being thus fitted, she then procures grass and dry leaves, as a bed for her young. There they lie secure from wet, and she continues to make their retreat equally so from danger; for all round this hill of her own raising, are holes running into the earth, that part from the middle apartment, like rays from a centre, and extend about fifteen feet in every direction: these resemble so many walks or chases, into which the animal makes her subterraneous excursions, and supplies her young with such roots or insects as she can provide: but they contribute still more to the general safety, for as the mole is very quick of hearing, the instant she perceives her little habitation attacked, she takes to her burrow, and unless the earth be dug away by several men at once, she and her young always make a good retreat.

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* **Hearing of the Mole.**—It is a common observation among ourselves, that the loss of one faculty, is generally in some measure compensated by the perfection of another. We have also frequent occasion to observe, that Nature, to a very considerable extent, is ever willing to vary and change the physicalities of a being, in accordance with its circumstances and situation. We need not, therefore, be surprised to find that the blind Spalax has the organs of hearing in a very perfect state. The external ear, indeed, has but a very small outward expansion, but the auditory canal is very large, and the whole organ internally greatly devoloped. When on the surface, they almost always carry the head raised, apparently for the purpose of more effectually hearing what is passing around them; thus relying on their most perfect faculty, for a forewarning of approaching danger, which they have not the means of detecting by sight.—Griffith.

† **Moles and Mole-catchers.** — "The moles are beginning to throw up the earth, and to destroy the herbage of the light soils. What an extraordinary animal is the mole! We constantly see his trace of destructiveness, but how difficult is it to track him to his hiding place. The mole is destroyed by a trap of peculiar construction, which is discharged by the little animal passing through it. The mole-catcher—in general a quiet old man, who passes the winter in making his traps in his chimney corner—comes forth at this season with his implements of destruction. His practised eyes soon discover the track of the mole, from the mound which he throws up to some neighbouring bank, or from one mound to another. It is in this track or run that he sets his trap, a few inches below the surface of the ground. As the mole passes through this little engine of his ruin, he disturbs a peg which holds down a strong hazel rod in a bent position. The moment the peg is moved, the end of the rod which is held down flies up, and with it comes up the poor mole dragged out of the earth which he has so ingeniously excavated, to be gibbeted

(*g*) Testes habet maximos, parastatas amplissimas, novum corpus seminale ab his diversum ac separatum. Penem etiam facile omnium, ni fallor, animalium longissimum, ex quibus colligere est maximam præ reliquis omnibus animalibus voluptatem in coitu, hoc abjectum et vile animalculum percipere, ut habeant quod ipsi invideant qui in hoc supremas vitæ suæ delicias collocant: Ray's Synops. Quadrup p 239. Huic opinioni assentitur D. Buffon, attamen non mihi apparet magnitudinem partium talem voluptatem augere. Maribus enim salacissimis contrarium obtinet

(*g*) Buffon.

The mole is scarcely found, except in cultivated countries: the varieties are but few. That which is found in Virginia, resembles the common mole, except in colour, which is black, mixed with a deep purple.[*] There are sometimes white moles, seen particularly in Poland, rather larger than the former. As their skin is so very soft and beautiful, it is odd that it has not been turned to any advantage. Agricola tell us, that he saw hats made from it, the finest and the most beautiful that could be imagined.

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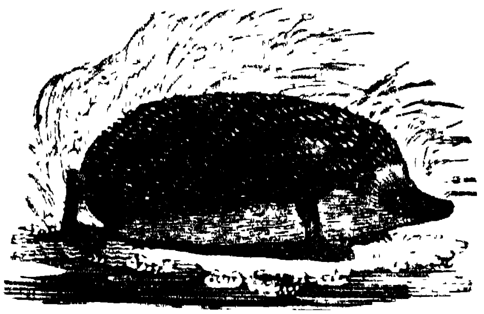
without a chance of escape. The trap is very simple and effectual; but, somehow, the moles flourish in spite of their human enemies. Mole-catchers, a plodding, unscientific race, know little of their trade, which requires the most accurate study of the habits of the animal. There was a Frenchman of the name of Le Court, a man of great knowledge and perseverance, who did not think it beneath him to devote his whole attention to the observation of the mole. He established a school for mole-catching, and taught many, what he had acquired by incessant practice, the art of tracing the mole to his hiding place in the ground, and cutting off his retreat. The skill of this man once saved a large and fertile district of France from inundation by a canal, whose banks the moles had undermined in every direction. Le Court alone saw the mischief, and could stop it. Doubts have been entertained, whether the moles are really so mischievous to the farmer as they are generally supposed to be. It has been said that they assist the draining of land by forming their excavations, and that they thus prevent the foot-rot in sheep."— NATURALISTS' CALENDAR, APRIL.

[*] NORTH AMERICAN SHREW-MOLE. — The shrew-mole resembles the common European mole in its habits, in leading a subterraneous life, forming galleries, throwing up little mounds of earth, and in feeding principally on earthworms and grubs. Dr. Godman has given a detailed and interesting account of their manners, particularly of one which was domesticated by Mr Titian Peale. He mentions that they are most active early in the morning, at mid-day, and in the evening, and that they are well known in the country to have the custom of coming daily to the surface *exactly at noon*. They may then be taken alive by thrusting a spade beneath them, and throwing them on the surface, but can scarcely be caught at any other period of the day. The captive one in the possession of Mr. Peale ate considerable quantities of fresh meat, either cooked or raw, drank freely, and was remarkably lively and playful, following the hand of its feeder by the scent, burrowing for a short distance in the loose earth, and, after making a small circle, returning for more food. When engaged in eating he employed his flexible snout in a singular manner to thrust the food into his mouth, doubling it so as to force it directly backwards. — DR. RICHARDSON'S ZOOLOGY OF NORTH AMERICA.

CHAP. XVI.

ANIMALS OF THE HEDGE-HOG, OR PRICKLY KIND.*



(Hedge-Hog.)

Animals of the hedge-hog kind require but very little accuracy to distinguish them from all others. That hair which serves the generality of quadrupeds for warmth and ornament, is partly wanting in these; while its place is supplied by sharp spines or prickles, that serve for their defence.

The hedge-hog, with an appearance the most formidable, is yet one of the most harmless animals in the world: unable or unwilling to offend, all its precautions are only directed to its own security; and it is armed with a thousand points, to keep off the enemy, but not to invade him.

This animal is of two kinds: one with a nose like the snout of a hog; the other, more short and blunt, like that of a dog. That with the muzzle of a dog is the most common, being about six inches in length, from the tip of the nose to the insertion of the tail. The tail is little more than an inch long; and so concealed by the spines, as to be scarce visible: the head, back, and sides, are covered with prickles; the nose, breast, and belly, are covered with fine, soft hair;(*g*) the legs are short, of a dusky colour, and almost bare; the toes on each foot are five in number, long and separated; the prickles are about an inch in length, and very sharp pointed, their lower part is white, the middle black, and the points white: the eyes are small, and placed high in the head; the ears are round, pretty large, and naked; the mouth is small, but well furnished with teeth; these, however, it only uses in chewing its food, but neither in attacking nor defending itself against other animals. Its only reliance in cases of danger, is on its spines; the instant it perceives an enemy, it puts itself into a posture of defence, and keeps upon its guard until it supposes the danger over. On such occasions, it immediately alters its whole appearance: from its usual form, somewhat resembling a small animal, with a bunch on its back, the animal begins to bend its back, to lay its head upon its breast, to shut its eyes, to roll down the skin of its sides towards the legs, to draw these up, and lastly, to tuck them in on every side, by drawing the skin still closer. In this form, which the hedge-hog always puts on when disturbed, it no way resembles an animal, but rather a roundish mass of prickles, impervious on every side. The shape of the animal thus rolled up, somewhat resembles a chestnut in the husk; there being, on one side, a kind of flat space, which is that on which the head and legs have been tucked in.

The hedge-hog, like most other wild animals, sleeps by day, and ventures out by night. It generally resides in small thickets, in hedges, or in ditches covered with bushes; there it makes a hole of about six or eight inches deep, and lies well wrapped up, in moss, grass, or leaves. Its food is roots, fruits, worms, and insects.

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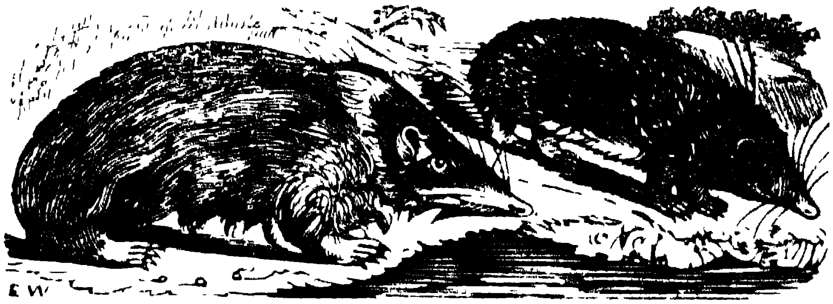
* **Hedge-hog's** have two front teeth in each jaw; those of the upper jaw are distant from each other, those of the lower are placed near together; the canine teeth are five on each side in the upper jaw, and three in the lower; there are four grinders on each side both above and below; and the body is clothed on the upper parts with sharp spines. There are seven species, of which only the common hedge-hog is found in Europe.

(*g*) Præputium propendens. Linnæi Syst. 75. And of the female he might have said, resupina copulatur.

Buffon, who kept these animals tame about his house, acquits them of the reproach of being mischievous in the garden; but then he accuses them of tricks, of which from the form and habits of this animal one would be never led to suspect them. "I have often," says he, "had the female and her young brought me about the beginning of June: they are generally from three to five in number: they are white in the beginning, and only the marks of their spines appear: I was willing to rear some of them, and accordingly put the dam and her young into a tub, with abundant provision beside them; but the old animal, instead of suckling her young, devoured them all, one after another. On another occasion, a hedge-hog that had made its way into the kitchen, discovered a little pot, in which there was meat prepared for boiling; the mischievous animal drew out the meat, and left its excrements in the stead. I kept males and females in the same apartment, where they lived together but never coupled. I permitted several of them to go about my garden; they did very little damage, and it was scarcely perceivable that they were there: they lived upon the fruits that fell from the trees: they dug the earth into shallow holes: they ate caterpillars, beetles, and worms; they were also very fond of flesh, which they devoured boiled or raw."

They couple in spring, and bring forth about the beginning of summer. They sleep during the winter, and what is said of their laying up provisions for that season, is consequently false. They at no time eat much, and can remain very long without any food whatsoever. Their blood is cold, like all other animals that sleep during the winter. Their flesh is not good for food; and their skins are converted to scarce any use, except to muzzle calves, to keep them from sucking.

THE TANREC AND TENDRAC.—The Tanrec and Tendrac, are two little animals, described by Buffon, of the hedge-hog kind; but yet sufficiently different from it, to constitute a different species. Like the hedge-hog, they are covered with prickles, though mixed in a greater proportion with hair; but unlike that animal, they do not defend themselves by rolling up in a ball. Their wanting this last property is alone sufficient to distinguish them from an animal in which it makes the most striking peculiarity: as also, that in the East Indies, where only they are found, the hedge-hog exists separately also: a manifest proof that this animal is not a variety caused by the climate.


(Tanrec) (Tendrac.)

The tanrec is much less than the hedge-hog,(*g*) being about the size of a mole, and covered with prickles, like that animal, except that they are shorter and smaller. The tendrac is still less than the former, and is defended only with prickles upon the head, the neck, and the shoulders; the rest being covered with a coarse hair, resembling a hog's bristles. These little animals, whose legs are very short, move but slowly. They grunt like a hog; and wallow, like it, in the mire. They love to be near water; and spend more of their time there than upon land. They are chiefly in creeks and harbours of salt water. They multiply in great numbers, make themselves holes in the ground, and

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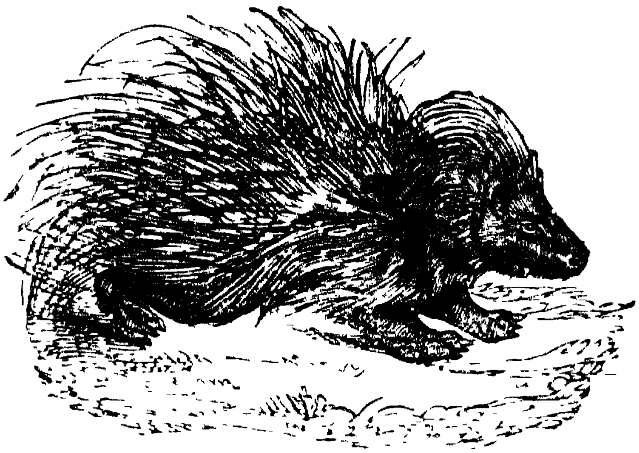
(*g*) Buffon, vol. xxv. p. 254.

sleep for several months. During this torpid state, their hairs (and I should also suppose their prickles) fall; and they are renewed upon their revival. They are usually very fat; and although their flesh be insipid, soft, and stringy, yet the Indians find it to their taste, and consider it as a very great delicacy.



(Porcupine)

THE PORCUPINE.*—Those arms which the hedge-hog possesses in miniature, the porcupine has in a more enlarged degree. The short prickles of the hedge-hog are in this animal converted into shafts. In the one the spines are about an inch long; in the other, a foot. The porcupine is about two feet long, and fifteen inches high. Like the hedge-hog, it appears a mass of misshapen flesh, covered with quills, from ten to fourteen inches long, resembling the barrel of a goose-quill in thickness; but tapering and sharp at both ends. These, whether considered separately or together, afford sufficient subject to detain curiosity. Each quill is thickest in the middle; and inserted into the animal's skin in the same manner as feathers are found to grow upon birds. It is within side spongy, like the top of a goose-quill; and of different colours, being white and black alternately, from one end to the other. The biggest are often found fifteen inches long, and a quarter of an inch in diameter; extremely sharp, and capable of inflicting a mortal wound. They seem harder than common quills, being difficult to be cut, and solid at that end which is not fixed in the skin. If we examine them in common, as they grow upon the animal, they appear of two kinds; the one such as I have already described; the other, long, flexible and slender, growing here and there among the former. There is still another sort of quills, that grow near the tail, white and transparent, like writing quills, and that seem to be cut short at the end. All these quills, of whatsoever kind, incline backwards, like the bristles of a hog; but when the animal is irritated, they rise, and stand upright, as bristles are seen to do.†

Such is the formation of this quadruped, in those parts in which it differs from most others: as to the rest of its figure, the muzzle bears some resemblance to that of a hare, but black; the legs are very short, and the feet have five toes, both before and behind; and these, as well as the belly, the head, and all other parts of the body, are covered with a sort of short hair, like prickles, there being no part, except the ears and the sole of the foot, that is free from them: the ears are thinly covered with very fine hair: and are in shape like those of mankind; the eyes are small like those of a hog, being only one-third of an inch from one corner to the other. After the skin is taken off, there appear a kind of paps on those parts of the body from whence the large quills proceed; these are about the size of a small pea, each answering to as many holes which appear on the outward surface of the skin, and which are about half an inch deep, like as many hollow pipes, wherein the quills are fixed, as in so many sheaths.

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* **The Porcupine** has two front teeth in each jaw, which are cut obliquely; and eight grinders on each side in both jaws; there are four toes on the fore-feet, and five on the hinder. There are five species beside the common porcupine.

† **Economy**.—Professor Thunberg, in his second journey to the island Mature, in the Indian Ocean, informs us, that the porcupine has a very curious method of fetching water for its young. The quills in the tail are said to be hollow, and to have a hole at the extremity; these the animal can bend in such a manner, as that they can be filled with water, which is afterwards discharged in the nest among its young.

This animal seems to partake very much of the nature of the hedge-hog; having this formidable apparatus of arms rather to defend itself, than annoy the enemy. There have been, indeed, many naturalists who supposed that it was capable of discharging them at its foes, and killing at a great distance off. But this opinion has been entirely discredited of late; and it is now universally believed that its quills remain firmly fixed in the skin, and are then only shed when the animal moults them, as birds do their feathers. It is probable, that the porcupine when attacked by bolder animals, directs its quills so as to keep always pointing towards the enemy.* These are an ample protection; and, as we are assured by Kolben, at such times, even the lion himself will not venture to make an attack. From such, therefore, the porcupine can defend itself: and chiefly hunts for serpents, and all other reptiles, for subsistence. Travellers universally assure us that, between the serpent and the porcupine there exist an irreconcileable enmity, and that they never meet without a mortal engagement.

The Americans, who hunt this animal, assure us, that the porcupine lives from twelve to fifteen years. During the time of coupling, which is in the month of September, the males become very fierce and dangerous, and often are seen to destroy each other with their teeth. The female goes with young seven months, and brings forth but one at a time; this she suckles but about a month, and accustoms it betimes to live, like herself, upon vegetables and the bark of trees; she is very fierce in its defence; but, at other seasons, she is fearful, timid, and harmless.

The porcupine does not escape so well from the Indian hunter, who eagerly pursues it, in order so make embroidery of its quills, and to eat its flesh. This, as we are commonly told, is very tolerable eating; however, we may expect wretched provisions when the savages are to be our caterers, for they eat every thing that has life. But they are very ingenious with regard to their embroidery: if I understand the accounts rightly, they dye the quills of various colours, and then splitting them into slips, as we see in the making of a cane-chair, they embroider, with these, their belts, baskets, and several other necessary pieces of furniture.

The porcupines of America differ very much from those of the ancient continent, which we have been describing; and, strictly speaking, may be considered as animals of a different species: however, from their being covered with quills, we will only add them as varieties of the former, since we know very little concerning them, except their difference of figure. They are of two kinds; the one called the coendou: and the other, first named by Buffon, the urson; the one a native of the northern parts of America, the other of the south; and both differing from the former, in having long tails, whereas that has a very short one.

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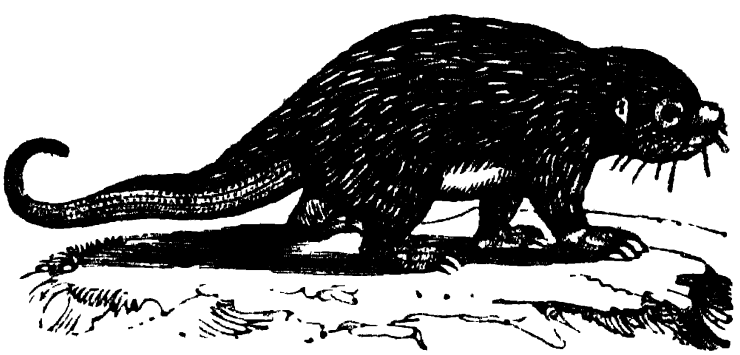
* PORCUPINE QUILLS.—Porcupines are often found in beating canes for hogs; they are easily speared; the flesh of the young ones is very good, and sometimes similar to pork or veal. With respect to shooting their quills, it is merely fabulous: dogs are apt to run upon them, and the quills being sharp, penetrate so deeply, and hold so fast, as to occasion them to quit their matrice or insertion in the porcupine's skin. The wounds are not dangerous except from their depth. Many horses will not approach porcupines when running, by reason of a peculiar rattling their quills make against each other. The horseman should stab his spear into porcupines, there being no danger in approaching them —ORIENTAL FIELD SPORTS.

M. D Vaillant in his Travels, says, that owing to some pernicious quality in the quills, one of his Hottentots, who had received a wound in his leg from a porcupine, was ill for more than six months.

SHOOTING ITS QUILLS. Upon the slightest irritation it raises its quills, and shakes them with great violence, directing them to that quarter from whence it is in danger of being attacked, and striking at the object of its resentment at the same time. "We have observed, on an occasion of this sort, at a time when the animal was moulting or casting its quills, that they would fly out to the distance of a few yards, with such force as to bend the points of them against the board where they struck; and it is not improbable that a circumstance of this kind may have given rise to an opinion of its power to use them in a more effectual manner.—BEWICK'S HISTORY OF QUADRUPEDS.

The coendou, is much less than the porcupine; its quills are four times shorter, its snout more unlike that of a hare; its tail is long enough to catch by the branches of trees, and hold by them. It may be easily tamed, and is to be found chiefly in the southern parts of America; yet is not wanting also in the northern.*

* The Prehensile Porcupine or Coendou. –The relations which animals were first observed to bear to one another reposed on general appearances only, on the resemblance of their outward forms, on the nature of their integuments, and, in a word, on the most superficial and obvious organs. Thus the porcupine and the hedge-hog, being both covered with a conspicuous defensive armour of spines, were classed together, as being animals whose organization was analogous. They were regarded in this manner by the ancients; and in the posthumous volumes of Aldrovandus, published in the 17th century, we find them thus associated together. The erroneous nature of these approximations was so palpable, that it was detected the instant an attempt was made to classify animals by their natural affinities; and the porcupine was transfered to the rodentia, while the hedge-hog was left next the shrews. But the porcupine was not the only rodent which had long spines instead of hairs: other species were found in America, in the East Indies, and in Africa; and we find Ray, Linnæus, and the majority of their successors, grouping all these animals in the same genus, under the common appellation of porcupine (*Hystrix*). In this approximation they were doubtless influenced, though with some restrictions, by the same preconception which had guided their predecessors, by that early notion that animals covered with integuments of so remarkable a kind should form a natural group. However, as one of these porcupines had a prehensile tail, M. de Lacépède separated it from the rest, to form the type of a distinct though allied genus.



(Prehensile Porcupine.)

These rodentia, armed at all points by strong and acute spines, – the porcupines mentioned in travels and works of natural history,—are already ascertained to be tolerably numerous; but they are far from being all so well known as to enable us to determine their real nature, and mark out their affinities. Those of Italy and Spain are said to have been originally derived from Africa. Porcupines are common in Barbary, Abyssinia, Guinea, and at the Cape of Good Hope: they are met with in Asia Minor, Palestine, and Persia: they exist in all the southern parts of Asia, and the neighbouring islands; and lastly, South and North America equally produce them.

From what we know already of the laws which regulate the geographical distribution of animals, it might be presumed that these spine-coated rodentia would include different genera, requiring only the means of instituting the necessary comparisons in order to bring their distinctive characters to light. This has been effected in a great measure by the labours of M. Fred. Cuvier, who has separated from the genus *Hystrix* of Linnæus, the Java porcupine, under the title of *Acanthion*; the Canada porcupine, or urson of Buffon, under that of *Erethizon;* the Brazilian porcupine, under that of *Sphiggurus:* and for the Mexican species, he proposes the generic name of *Synetheres,* as preferable to that of *Coendus*, originally given to it by the Count Lacépède.

The coendou is an animal altogether peculiar and distinct: no other species resembles it in its general forms. Its gait is as heavy and ungraceful as its proportions, notwithstanding it is endowed with an additional locomotive organ to those usually granted to the rodentia, viz. a prehensile tail. But it is in the shape of the head and muzzle that it is more especially remarkable. All that part which corresponds to the brain is raised and expanded so as to announce a most highly developed cerebral organ within; but this is in reality no larger than in other rodents. The phrenological character is here produced by

ANIMALS OF THE HEDGE-HOG KIND.

The urson, which Buffon calls after our countryman Hudson, is a native of Hudson's Bay. The make of the body of this animal is not so round as that of the two former, but somewhat resembling the shape of the pig. It is covered with long bristly hair, with a shorter hair underneath; and under this the quills lie concealed very thick; they are white, with a brown point, and bearded, and the longest do not exceed four inches; they stick to the hand when the animal is stroked on the back; and likewise, when the hand is taken away, they stick so fast as to follow it. They make their nest under the roots of great trees, sleep very much, and chiefly feed upon the bark of the juniper. In winter the snow serves them for drink; and in summer they lap water, like a dog. They are very common in the country lying to the east of Hudson's Bay; and several of the trading Americans depend on them for food, at some seasons of the year.*

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large sinuses, which extend in every direction over the frontal bones, covering the brain anteriorly, and augmenting the extent of the organ of smell; for these cavities communicate with the nostrils. The muzzle presents a thick, obtuse, fleshy projection, in front of which are the orifices of the nostrils, of a very simple form. In all these respects there is no resemblance between this animal and the porcupine; and the same characters serve even better than the prehensile tail to separate it from every other rodent, being indicative of a fundamentally different nature, peculiar habits, and consequently the type of a distinct genus. But if by its physiognomy it is found isolated from all the other known species of its class, it nevertheless appertains in its dentition, like the other spiny genera, to the omnivorous rodentia with compound teeth.

The coendou has four molaries on either side, both in the upper and the lower jaw, which diminish in size from before backwards: their structure is analogous to that of the urson.

The external conformation does not indicate a lively or predominant sensibility in any of the organs of sense. The eyes are small and prominent, and their pupil, which can only be distinguished by a weak light, is round: it is closed altogether in full daylight. The nostrils open by two simple circular apertures, which are situated close together on a broad flattened surface, covered with a smooth but not glandular integument. It is by the sense of smell chiefly that this animal takes cognizance of external objects. The ear is of an extremely simple structure, being composed merely of a circular ridge crossed transversely by two slight elevations. The mouth is of a remarkably diminutive size, scarcely opening sufficiently to allow a passage for the incisors, or permitting any great degree of separation of the jaws. The tongue is smooth: there are no cheek pouches.

The exterior coat consists almost entirely of spines, adhering to the skin by a narrow pedicle, and consequently detaching themselves readily from it. Hairs are found only on the under parts of the body and upon a portion of the tail. Strong whiskers project from the sides of the muzzle. The organs of motion have a special structure, from which results the natural destination of the coendou to be an animal of the woods, to live on trees, to dwell on their summits, to derive from them its nourishment, and there to propagate and rear its family. Its fore feet are strong, with four distinct and regular digits, armed with long and strong, but thin and pointed, claws. The thumb is indicated merely by a large movable tubercle, covered with a very papillose skin, and capable of being opposed to a certain degree to the other digits. The hind-feet have also four toes; the sole is similarly papillose, and the thumb seems still more developed in them than in the fore-feet; so that the animal can truly grasp objects between this thumb and the other digits, which gives it the faculty of perching, almost like birds, on the smallest branches.

The spines are mostly of a yellowish white colour at the root, black in the middle, and white at their extremity. The thickest are on the anterior parts of the body, and the longest on the back, where they measure about three inches in length. On the extremities, the sides of the head, and along the first half of the tail, they are thinner and shorter; and on the remainder of the tail, and on the under parts of the body, they are gradually reduced to the dimensions of simple airs. The muzzle and soles of the feet are naked, and are of a reddish brown colour.

All the movements of the coendou are slow, and bespeak circumspection and timidity. It only takes exercise in the evening, or during the night; and although it is then tolerably active, it has never been seen to make a bound. When it would pass from one place to another, it advances by degrees, fixing each of its feet; and before raising any of them it assures itself of the stable footing of the others; and its tail, wound round the objects within its reach, is ready to grasp them if the other points of support should fail. This animal can raise itself upon its hind-feet, and in that position carries its food to its mouth with the fore-feet.

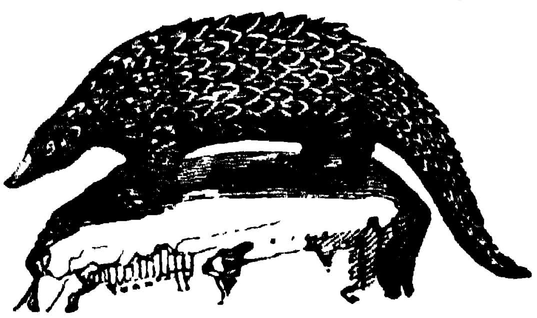
* THE PORCUPINE.—We are informed by

CHAP. XVII.

QUADRUPEDS COVERED WITH SCALES OR SHELLS INSTEAD OF HAIR.(g)

When we talk of a quadruped, the name seems to imply an animal covered with hair; when we mention a bird, it is natural to conceive a creature covered with feathers; when we hear of a fish, its scales are generally the first part that strikes our imagination.* Nature, however, owns none of our distinctions; various in all her operations, she mixes her plans, groups her pictures, and excites our wonder as well by her general laws as by her deviations.

Were we to judge of nature from definitions only, we should never be induced to suppose that there existed races of vivaparous quadrupeds destitute of hair, and furnished with scales and shells in their stead. However, nature, every way various, supplies us with many instances of these extraordinary creatures; the old world has its quadrupeds covered with scales, and the new with a shell. In both they resemble each other, as well in the strangeness of their appetites, as in their awkward conformation. Like animals but partially made up, and partaking of different natures, they want those instincts which animals formed but for one element alone are found to possess. They seem to be a kind of strangers in nature, creatures taken from some other element, and capriciously thrown to find a precarious subsistence upon land.



(Pangolin)

The Pangolin, which has been usually called the scaly lizard, Buffon very judiciously restores to that denomination by which it is known in the countries where it is found. This animal, which is a native of the torrid climates of the ancient continent, is, of all other animals, the best protected from external injury by nature. It is about three or four feet long, or, taking in the tail, from six to eight. Like the lizard, it has a small head, a very long nose, a short, thick neck, a long body, legs very short, and a tail extremely long, thick at the insertion, and terminating in a point. It has no

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Agricola, that the porcupine of Italy was an exotic in that country, brought either from Africa or India. It has long been naturalized in the south of Europe. The only difference observed between the porcupine of Italy and that of Africa is, that the former is rather less than the latter, and that the spines are not so strong. The European variety is found principally in the kingdom of Naples, and in the southern parts of the Roman States. It avoids populous parts, and selects stony and dry situations. Its extreme timidity seems to induce it to continue in its retreat and to seek its sustenance only in the night.—Griffith.

* Genus Dasypus.—We possessed very scanty information on these animals till D'Azara published his Essay on the Quadrupeds of Paraguay, which includes eight species. He tells us that most of them dig burrows in the earth, which they commonly direct under an angle of 45°; but that they turn so as to make it difficult to ascertain their length, which is presumed, however, to be from six to eight feet.

Some of the species have nocturnal habits, and are very timid, flying to their burrows the moment they hear a noise. These are very much quicker in their motions than might be supposed, from the hindrances incident to their heavy covering. Other species quit their retreat equally by day and night, and these are said not to be so rapid in their motions as the others.—Cuvier.

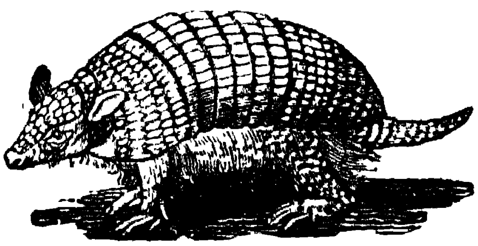
(g) This chapter is chiefly extracted from Buffon, which I mention at once, to save the trouble of repeated quotations.

teeth, but is armed with five toes on each foot, with long white claws. But what it is chiefly distinguished by is its scaly covering, which in some measure hides all the proportions of its body. These scales defend the animal on all parts, except the under part of the head and neck, under the shoulders, the breast, the belly, and the inner side of the legs; all which parts are covered with a smooth soft skin, without hair. Between the shells of this animal, at all the interstices, are seen hairs like bristles, brown at the extremity, and yellow towards the root. The scales of this extraordinary creature are of different sizes and different forms, and stuck upon the body somewhat like the leaves of an artichoke. The largest are found near the tail, which is covered with them like the rest of the body. These are above three inches broad, and about two inches long, thick in the middle, and sharp at the edges, and terminated in a roundish point. They are extremely hard, and their substance resembles that of horn. They are convex on the outside, and a little concave on the inner; one edge sticks in the skin, while the other laps over that immediately behind it. Those that cover the tail conform to the shape of that part, being of a dusky brown colour, and so hard, when the animal has acquired its full growth, as to turn a musket-ball.

Thus armed, this animal fears nothing from the efforts of all other creatures, except man. The instant it perceives the approach of an enemy, it rolls itself up like the hedge-hog, and presents no part but the cutting edges of its scales to the assailant. Its long tail, which, at first view, might be thought easily separable, serves still more to increase the animal's security. This is lapped round the rest of the body, and, being defended with shells even more cutting than any other part, the creature continues in perfect security. Its shells are so large, so thick, and so pointed, that they repel every animal of prey; they make a coat of armour that wounds while it resists, and at once protects and threatens. The most cruel, the most famished quadruped of the forest, the tiger, the panther, and the hyæna, make vain attempts to force it. They tread upon, they roll it about, but all to no purpose; the pangolin remains safe within, while its invader almost always feels the reward of its rashness. The fox often destroys the hedge-hog by pressing it with his weight, and thus obliges it to put forth its nose, which he instantly seizes, and soon after the whole body; but the scales of the pangolin effectually support it under any such weight, while nothing that the strongest animals are capable of doing can compel it to surrender. Man alone seems furnished with arms to conquer its obstinacy. The negroes of Africa, when they find it, beat it to death with clubs, and consider its flesh as a very great delicacy.

But, although this animal be so formidable in its appearance, there cannot be a more harmless, inoffensive creature when unmolested. It is even unqualified by nature to injure larger animals, if it had the disposition, for it has no teeth. It should seem that the bony matter, which goes in other animals to supply the teeth, is exhausted in this in supplying the scales that go to the covering of its body. However this be, its life seems correspondent to its peculiar conformation. Incapable of being carnivorous, since it has no teeth, nor of subsisting on vegetables, which require much chewing, it lives entirely upon insects, for which nature has fitted it in a very extraordinary manner. As it has a long nose, so it may naturally be supposed to have a long tongue; but, to increase its length still more, it is doubled in the mouth, so that when extended it is shot out to above a quarter of a yard beyond the tip of the nose. This tongue is round, extremely red, and covered with an unctious and slimy liquor which gives it a shining hue. When the pangolin, therefore, approaches an ant hill, for these are the insects on which it chiefly feeds, it lies down near it, concealing as much as possible the place of its retreat, and stretching out its long tongue among the ants, keeps it for some time quite immovable. These little animals, allured by its appearance, and the unctuous substance with which it is smeared, instantly gather upon it in great numbers; and when the pangolin supposes a sufficiency, it quickly withdraws the tongue, and swallows them at once. This peculiar manner of hunting for its prey is repeated either till it be satisfied, or till the ants, grown more cautious, will be allured to their destruction no longer. It is against these noxious insects, therefore, that its only force or cunning is exerted; and were the negroes but sufficiently sensible of its utility in destroying one of the greatest pests to their country, they would not be so eager to kill it.

Of this animal, there is a variety which is called the phatagin, much less than the former, being not above a foot long from the head to the tail, with shells differently formed, with its belly, breast, and throat covered with hair, instead of a smooth skin as in the former; but that by which it is peculiarly distinguished is the extent of its tail, which is above twice the length of its body. Both are found in the warm latitudes of the east, as well as in Africa; and, as their numbers are but few, it is to be supposed their fecundity is not great.


(Six Banded Armadillo.)

THE ARMADILLO or **TATOU.**—Having mentioned quadrupeds of the ancient continent covered with scales, we come next to quadrupeds of the new continent covered with shells. The armadillo is chiefly an inhabitant of South America, a peaceful, harmless creature, incapable of offending any other quadruped, and furnished with a peculiar covering for its own defence. The pangolin, described above, seems an inactive, helpless being, indebted for safety more to its patience than its power; but the armadillo is still more exposed and helpless. The pangolin is furnished with an armour that wounds while it resists, and that is never attacked with impunity: but the armadillo is obliged to submit to every insult, without any power of repelling its enemy; it is attacked without danger, and is consequently liable to more various persecutions.*

This animal being covered, like a tortoise, with a shell, or rather a number of shells, its other proportions are not easily discerned. It appears, at first view, a round, misshapen mass, with a long head, and a very large tail sticking out at either end, as if not of a piece with the rest of the body. It is of different sizes, from a foot to three feet long, and covered with a shell divided into several pieces, that lap over each other like the plates in a coat of armour, or in the tail of a lobster. The difference in the size of this animal, and also the different disposition and number of its plates, have been considered as constituting so many species, each marked with its own particular name. In all, however, the animal is partially covered with this natural coat of mail; the conformation of which affords one of the most striking curiosities in natural history. This shell, which in every respect resembles a bony substance, covers the head, the neck, the back, the sides, the rump, and the tail to the very point. The only parts to which it does not extend are the throat, the breast, and the belly, which are covered with a white, soft skin, somewhat resembling that of a fowl stripped of its feathers. If these naked parts be observed with attention, they will be found covered with the rudiments of shells, of the same substance with those which cover the back. The skin, even in the parts that are softest, seems to have a tendency to ossify; but a complete ossification takes place only on those parts which have the least friction, and are the most exposed to the weather. The shell, which covers the upper part of the body, differs from that of the tortoise, in being composed of more pieces than one, which lie in bands over the body, and, as in the tail of the lobster, slide over each other, and are connected by a yellow membrane in the same manner. By this means the animal has a motion in its back, and the armour gives way to its necessary inflections. These bands are of various numbers and sizes, and from them these animals have been distinguished into various kinds. In general however, there are two large pieces that cover, one the shoulders and the other the rump. In the back, between these, the bands are placed in different numbers, that lap over each other, and give play to the whole. Besides their opening cross-ways, they also open down along the back, so that the animal can move in every direction. In some there are but three of these bands between the large pieces; in others there are six; in a third kind there are eight: in a fourth kind, nine; in a fifth kind, twelve; and lastly, in the sixth kind there is but one large piece, which covers the shoulders, and the rest of the body is covered with bands all down to the tail. These shells are differently coloured in different kinds, but most usually they are of a dirty grey. This colour in all arises from another peculiar circumstance in their conformation, for the shell itself is covered with a softish skin, which is smooth and transparent.

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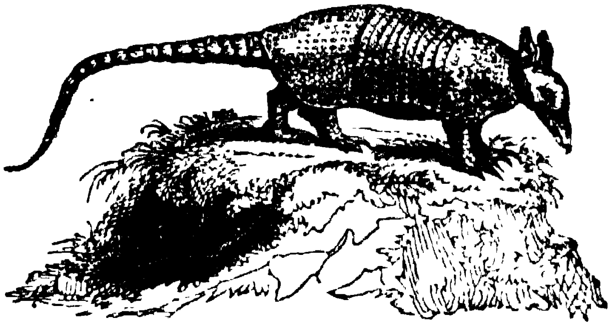
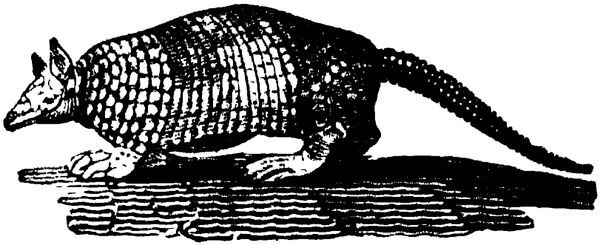
* New Species of Armadillo.—In the district of Cuyo, at the foot of the Andes, on the eastern side, is occasionally discovered a very curious little quadruped, which unites the habits of the mole to the appearance of the armadillo. Its upper parts and sides are defended by a coat, or rather cloak, of mail, of a coriaceous nature but exceeding in inflexibility sole-leather of equal thickness. This cloak does not adhere, like that of the armadillo, to the whole surface, occupying the place of the skin—but is applied over the skin and fur, forming an additional covering, which is attached only along the middle of the back and on the head. The hinder parts of the animal are also protected by it, to cover which, it is suddenly bent downwards at nearly a right angle. The tail is short, and is directed forwards along the under surface of the body. Owing to the rigidity of the case which so nearly incloses the animal, its motions must be limited almost entirely to those of mere progression, and even for these, the structure of its fore-feet is ill suited. The anterior limbs are, indeed, scarcely fitted for any other purpose than that of burrowing. For this operation, the long and broad claws with which they are furnished are truly admirably adapted: and their sharp points and cutting lower edges must materially assist in clearing a way through the entangled roots which it may encounter in its subterranean travels. Its teeth resemble those of the sloth more nearly than any other animals: and it seems to represent, beneath the earth, that well-known and singular inhabitant of trees—for its motions, so far as can be conjectured from its conformation, must also be executed with extreme slowness. A specimen, preserved in spirit, has recently been added to the museum of the Zoological Society, by the Hon. Captain Percy, R. N. who received it from Woodbine Parish Esq. British consul at Buenos Ayres. This is the first instance of its being brought to Europe, to the naturalists of which it had previously been known only by the figures and description recently given by Dr Harlan, in the Annals of the Lyceum of Natural History of New York.—Arcana of Science, 1828.


(Nine-banded Armadillo.)

But, although these shells might easily defend this animal from a feeble enemy, yet they could make but a slight resistance against a more powerful antagonist; nature, therefore, has given the armadillo the same method of protecting itself with the hedge-hog or the pangolin. The instant it perceives itself attacked, it withdraws the head under its shells, and lets nothing be seen but the tip of the nose; if the danger increases, the animal's precautions increase in proportion; it then tucks up its feet under its belly, unites its two extremities together, while the tail seems as a band to strengthen the connexion; and it thus becomes like a ball, a little flattish on each side. In this position it continues obstinately fixed, while the danger is near, and often long after it is over. In this situation it is tossed about at the pleasure of every other quadruped, and very little resembling a creature endowed with life and motion. Whenever the Indians take it, which is in this form, by laying it close to the fire, they soon oblige the poor animal to unfold itself, and to face a milder death to escape a more severe.

As to the rest, these animals, though they all resemble each other in the general character of being clothed with a shell, yet differ a good deal in their size, and in the parts into which their shell is divided. The first of this kind, which has but three bands between the two large pieces that cover the back, is called the tatu apara. I will not enter into an exact description of its figure, which, how well written soever, no imagination could exactly conceive; and the reader would be more fatigued to understand than I to write it. The tail is shorter in this than any other kind, being not more than two inches long, while the shell, taking all the pieces together, is a foot long and eight inches broad. The second is the tatou of Ray, or the encoubert of Buffon: this is distinguished from the rest by six bands across the back; it is about the size of a pig of a month old, with a small, long head and a very long tail. The third is the tatuette, furnished with eight bands, and not by a great deal so big as the former. Its tail is longer also, and its legs shorter in proportion. Its body, from the nose to the insertion of the tail, is about ten inches long, and the tail seven. The fourth is the pig-headed armadillo, with nine bands. This is much larger than the former, being about two feet long from the nose to the tail. The fifth is the kabassou, or cataphractus, with twelve bands, and still bigger than the former, or any other of its kind. This is often found above three feet long, but is never eaten as the rest are. The sixth is the weasel-headed armadillo, with eighteen bands, with a large piece before, and nothing but bands backward. This is above a foot long, and the tail five inches. Of all these, the kabassou and the encoubert are the largest; the rest are of a much smaller kind.* In the larger kinds, the shell is much more


(Twelve-banded Armadillo.)

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* The Armadillo.—M. Fr. Cuvier makes the following observations on an armadillo closely allied to this species, which lived for many years in the Menagerie at the Garden of Plants in Paris. "If we were to judge of the intellectual faculties of the species by the individual now under consideration, we should conclude that the *Encoubert* possesses them in a very limited degree. When he is set at liberty, he goes running to the right and to the left, digging in one corner, and then suddenly stopping to run and scratch in another. A sudden noise startles him; he stops to listen, but he does not seem to perceive the presence of a new object, nor to distinguish a person from a stone; when he runs, he goes indiscriminately against every thing in his way, and passes over it or by the side of it, with equal indifference whether the obstacle be a piece of wood or an animal. His indifference in this respect is such, that I should be inclined to attribute it only to his inexperience, to the continual slavery in which he had lived, and to the habit he had contracted of being touched and carried about in the hand from one place to another. But he never learnt to distinguish the hand that fed him, and remained as unfamiliar with the person who had the care of him, as with any other individual. In this respect I cannot compare him better than to the animals of the lower classes; yet there are even among the insects some which seem to have received the faculty of judging and of discriminating in a higher degree than this animal."—*Hist. des Mammif.*

We have observed the same habits, the same unceremonious manner of running against or over anything that stood in their way, whether a rabbit, or another of their own species, in specimens living at the Surrey Zoological Gardens. A smaller variety of *Dasypus mustelinus*, or a species nearly allied to it, has attracted considerable notice at the gardens in the Regent's Park during the preceding year. The mode of locomotion and the habits of these individuals were similar to those above mentioned. In their place of confinement it was extremely amusing to see the mock air of business with which they would run from corner to corner, suddenly stopping as if to listen, then scratching and rearing themselves up until generally they lost their balance and tumbled backwards in the straw; these actions they would repeat over and over again in the most mechanical manner, until the patience of the observer at length became exhausted.

These animals have brought forth more than once since they came into the possession of the Zoological Society: and it seems by no means improbable that they might be as readily naturalized as the guinea-pig. There is perhaps no quadruped more easy to transport: a little food, either animal or vegetable, and a little milk suffice for their nourishment, and they readily bear close confinement. And as the species require to be rigorously solid than in the others, and the flesh is much harder and unfit for the table. These are generally seen to reside in dry, upland grounds, while the small species are always found in moist places, and in the neighbourhood of brooks and rivers. They all roll themselves into a ball; but those whose bands are fewest in number are least capable of covering themselves up completely. The Tatu Apara, for instance, when rolled up, presents two great interstices between its bands, by which it is very easily vulnerable, even by the feeblest of quadrupeds.

CHAP. XVIII.

ANIMALS OF THE BAT KIND.*

(The Bat.)

HAVING in the last chapter described a race of animals that unite the boundaries between quadrupeds and insects, I come in this to a very different class, that serve to fill up the chasm between quadrupeds and birds. Some naturalists, indeed, have found animals of the bat kind so much partaking of the nature of both, that they have been at a loss in which rank to place them, and have doubted, in giving the history of the Bat, whether it was a beast or a bird they were describing.

The bat in scarce any particular resembles the bird, except in its power of sustaining itself in the air. It brings forth its young alive; it suckles them; its mouth is furnished with teeth; its lungs are formed like those of quadrupeds; its intestines, and its skeleton, have a complete resemblance, and even are, in some measure, seen to resemble those of mankind. (*g*)

The bat most common in England, is about the size of a mouse; or nearly two inches and a half long. The membranes that are usually called wings, are, properly speaking, an extension of the skin all around the body, except the head, which, when the animal flies, is kept stretched on every side, by the four interior toes of the fore feet, which are enormously long, and serve like masts that keep the canvass of a sail spread, and regulate its motions.(*g*) The first toe is quite loose, and serves as a heel when the bat walks, or as a hook, when it would adhere to any thing. The hind feet are disengaged from the surrounding skin, and divided into five toes, somewhat resembling those of a mouse. The skin by which it flies is of a dusky colour. The body is covered with a short fur, of a mouse colour, tinged with red. The eyes are very small; the ears like those of a mouse.

This species of the bat is very common in England. It makes its first appear-

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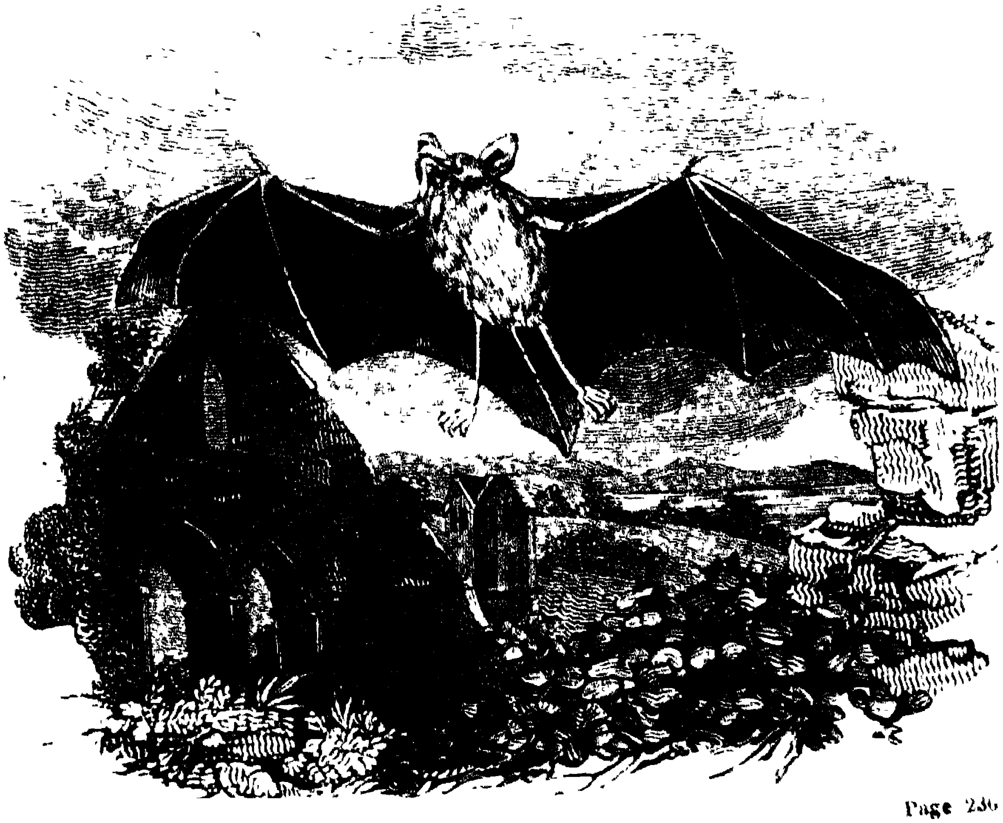
compared in order to determine the value of the characters that have been adopted to distinguish them, it is desirable that the facility with which they may be brought over should be generally known to those who make voyages from South America to Europe.—ZOOLOGICAL MAGAZINE.

* BATS.—The animals of this numerous family have sharp pointed, erect teeth, placed near together; the fore feet are webbed with a thin plicatile membrane which surrounds the body, and gives them the power of flight. They appear, from experiments made by Spallanzani, to have a remarkable additional sense, which enables them, when deprived of sight, to avoid objects in their way, as readily as when they have the full power of vision.

(*g*) Penis propendens.

(*g*) British Zoology.



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THE BAT.

ance early in summer, and begins its flight in the dusk of the evening.* It principally frequents the sides of woods, glades, and shady walks; and is frequently observed to skim along the surface of pieces of water. It pursues gnats, moths, and nocturnal insects of every kind. It feeds upon these; but will not refuse meat wherever it can find it. Its flight is a laborious, irregular movement; and if it happens to be interrupted in its course, it cannot readily prepare for a second elevation; so that if it strikes against any object, and falls to the ground, it is usually taken.* It appears only in the most pleasant evenings, when its prey is generally abroad, and flies in pursuit with its mouth open. At other times it continues in its retreat, the chink of a ruined building, or the hollow of a tree. Thus this little animal, even in summer, sleeps the greatest part of its time, never venturing out by daylight, nor in rainy weather; never hunting in quest of prey, but for a small part of the night, and then returning to its hole. But its short life is still more abridged by continuing in a torpid state, during the winter. At the approach of the cold season, the bat prepares for its state of lifeless inactivity, and seems rather to choose a place where it may continue safe from interruption, than where it may be warmly or conveniently lodged. For this reason it is usually seen hanging by its hooked claws to the roofs of caves, regardless of the eternal damps that surround it. The bat seems the only animal that will venture to remain in these frightful subterranean abodes, where it continues in a torpid state, unaffected by every change of the weather. Such of this kind as are not provident enough to procure themselves a deep retreat, where the cold and heat seldom vary, are sometimes exposed to great inconveniences, for the weather often becomes so mild in the midst of winter as to warm them prematurely into life, and to allure them from their holes in quest of food, when nature has not provided a supply. These, therefore, have seldom strength to return; but, having exhausted themselves in a vain pursuit, after insects which are not to be found, are destroyed by the owl, or any other animal that follows such petty prey.

The bat couples and brings forth in summer, generally from two to five at a time: of this I am certain, that I have found five young ones in a hole together; but whether they were the issue of one parent, I cannot tell. The female has but two nipples, and those forward on the breast, as in the human kind. Thus far this animal seems closely allied to the quadruped race. Its similitude to that of birds is less striking. As nature has furnished birds with extremely strong pectoral muscles, to move the wings, and direct their flight, so has it also furnished this animal. As birds also have their legs weak, and unfit for the purposes of motion, the bat has its legs fashioned in the same manner, and never seen to walk, or, more properly speaking, to push itself forward with its hind legs, but in cases of extreme necessity.

If we consider the bat as it is seen in our own country, we shall find it a harmless, inoffensive creature. It is true that it now and then steals into a larder, and, like a mouse, commits its petty thefts upon the fattest parts of the bacon. But this happens seldom; the general tenor of its industry is employed in pursuing insects that are much more noxious to us than itself can possibly be; while its evening flight, and its unsteady wabbling motion, amuse the imagination, and add one figure more to the pleasing group of animated nature.

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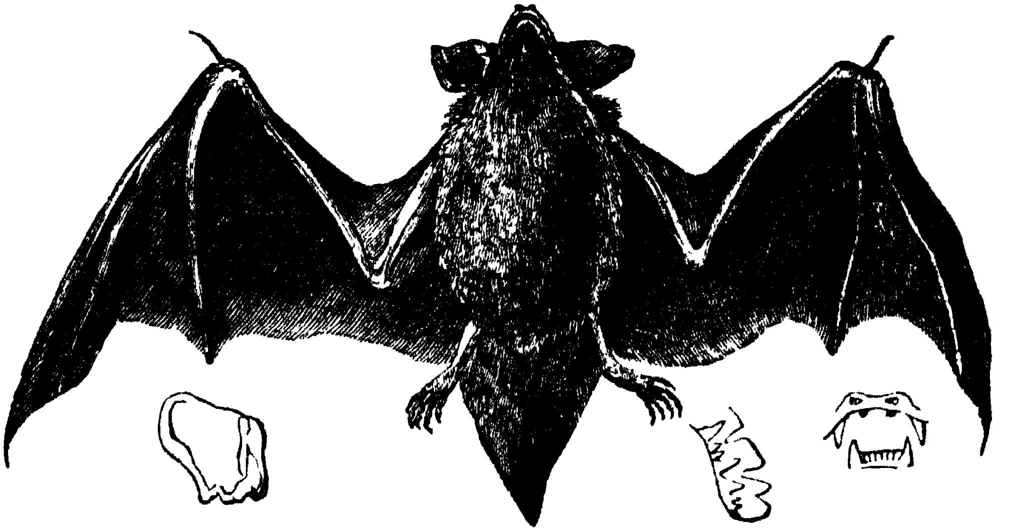
* Tame Bat.—Mr. White, in his "Selborne," gives an account of a tame bat: "It would take flies out of a person's hand; if you gave it any thing to eat, it brought its wings round before the mouth, hovering and hiding its head, in the manner of birds of prey when they feed. The adroitness it showed in shearing off the wings of flies, which it rejected, was worthy of observation, and pleased me much. Insects seemed to be the most acceptable, though it did not refuse raw flesh when offered, so that the notion that bats go down chimneys, and gnaw men's bacon seems no improbable story. While I amused myself with this wonderful quadruped, I saw it several times confute the vulgar opinion, that bats when down on a flat surface cannot get on the wing again, by rising with great ease from the floor. It ran, I observed, with more dispatch than I was aware of, but in a most ridiculous and grotesque mannner."—Natural History of Selborne.

The varieties of this animal, especially in our country, are but few; and the differences scarce worth enumeration. Of foreign bats, the largest we have any certain accounts of, is the Rousette, or the Great Bat of Madagascar. This formidable creature is near four feet broad, when the wings are extended; and a foot long, from the tip of the nose to the insertion of the tail. It resembles our bat in the form of its wings, in its manner of flying, and in its internal conformation. It differs from it in its enormous size; in its colour, which is red, like that of a fox; in its head and nose also, which resemble those of that animal, and which have induced some to call it the flying fox; it differs also in the number of its teeth; and in having a claw on the fore foot, which is wanting in ours. This formidable creature is found only in the ancient continent; particularly in Madagascar, along the coasts of Africa and Malabar, where it is usually seen about the size of a large hen. When they repose, they stick themselves to the tops of the tallest trees, and hang with their heads downwards. But when they are in motion, nothing can be more formidable; they are seen in clouds, darkening the air, as well by day as by night, destroying the ripe fruits of the country, and sometimes settling upon animals, and man himself: they devour indiscriminately fruits, flesh, and insects, and drink the juice of the palm-tree: they are heard at night in the forests at more than two miles distance, with a horrible din; but at the approach of day they usually begin to retire: nothing is safe from their depredations; they destroy fowls and domestic animals, unless preserved with the utmost care, and often fasten upon the inhabitants themselves, attack them in the face, and inflict very terrible wounds. In short, as some have already observed, the ancients seem to have taken their ideas of harpies from these fierce and voracious creatures, as they both concur in many parts of the description, being equally deformed, greedy, uncleanly, and cruel.*



(New Species of Bat)

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* **New Species of Bat.**—*Vespertilio Auduboni.*—The new species of this little flying quadruped, which we are now about to notice, belongs to a very large and respectable family. In the days of Linnæus, they all, from their appearance at twilight, went by the family name of *Vespertilio.* They further belong to the order *Carnivora,* their teeth being constructed for masticating flesh, though some, and in this they resemble ourselves, are also fond of fruit. In one important point, the whole race has a common character, in their organ of flight The bones of the fingers are extremely elongated, and united by a membrane, which is continued down the side of the body; and extending on the leg as far as the tarsus, also unites the legs and tail. Agreeing so universally in this particular, they form a very natural family, under the appropriate term, Cheiroptera, constructed from two Greek words, signifying *hand* and *wing.*

The vespertilio are again divided into **Genera** and *Species,* divisions which are grounded on certain peculiarities of dental structure, and various developements of the brachial, digital, and interfemoral appendages, with other modifications of the organs of

An animal not so formidable, but still more mischievous than these is the American Vampyre. This is less than the former; but more deformed, and still more numerous. It is furnished with a horn like the rhinoceros bat; and its ears are extremely long. The other kinds generally resort to the forest, and the most deserted places; but these come into towns and cities, and, after sunset, when they begin to fly, cover the streets like a canopy.(*g*) They are the common pest both of men and animals; they effectually destroy the one, and often distress the other. "They are," says Ulloa, "the most expert blood letters in the world. The inhabitants of those warm latitudes being obliged, by the excessive heats, to leave open the doors and windows of the chambers where they sleep, the vampyres enter, and if they find any part of the body exposed, they never fail to fasten upon it. There they continue to suck the blood; and it often happens that the person dies under the operation. They insinuate their tooth into a vein, with all the art of the most experienced surgeon, continuing to exhaust the body, until they are satiated. I have been assured," continues he, "by persons of the strictest veracity, that such an accident has happened to them; and that, had they not providentially awaked, their sleep would have been their passage into eternity; having lost so large a quantity of blood as hardly to find strength to bind up the orifice. The reason why the puncture is not felt is, besides the great precaution with which it is made, the gentle refreshing agitation of the bat's wings, which contribute to increase sleep, and soften the pain."

The purport of this account has been confirmed by various other travellers; who all agree that this bat is possessed of a faculty of drawing the blood from persons sleeping; and thus often destroying them before they awake. But still a very strong difficulty remains to be accounted for; the manner in which they inflict the wound. Ulloa, as has been seen, supposes it to be done by a single tooth; but this we know to be impossible, since the animal cannot infix one tooth without all the rest accompanying its motions; the teeth of the bat kind being pretty even, and the mouth but small. Buffon, therefore, supposes the wound to be inflicted by the tongue; which, however, appears to me too large to inflict an unpainful wound; and even less qualified for that purpose than the teeth. Nor can the tongue, as Buffon seems to suppose, serve for the purposes of suction, since for this it must be hollow like a syringe, which it is not found to be. I should therefore suppose, that the animal is endowed with a strong power of suction; and that, without inflicting any wound whatsoever, by continuing to draw it enlarges the pores of the skin in such a manner that

progression. These genera include species which are discovered in every habitable part of the globe, of various magnitudes, from the size of a half-grown cat, to that of a half-grown mouse.

Of this numerous family, only three genera, of modern authors, inhabit the United States, viz Rhinopoma, Vespertilio, and Taphozous. Seven species, exclusive of the present, are all that have been hitherto discovered in North America.

We propose to dedicate this new species to our valuable friend, the justly celebrated naturalist, J. J. AUDUBON, as a small tribute of respect to his eminent talents, and the highly important services he has rendered science. The drawing which accompanies this paper, is from his inimitable pencil.

This species was first observed during the summer of 1829, when an individual female flew into the apartment of the late Dr. Hammersly, then one of the resident physicians of the Pennsylvania hospital: on the subsequent evening a male individual, of the same species, was also taken in the same manner. In August, 1830, a very fine specimen was brought to the Academy of Natural Sciences, and Mr. Audubon informs me that the species has very recently been observed in New York. The natural characters of the species are:—General colour black, sprinkled with grey above and beneath; ears black and naked; auriculum, short and broad or obtusely triangular; interfemoral membrane, sparsely hairy; last joint of the tail free: two incisors with notched crowns, on each side of the canine teeth of the upper jaw, with a broad intervening space without teeth.

The dimensions are, total length 3 inches 7 tenths, tail 1·7; length of ear 0·5; breadth of ear 0·4; length of leg 1·7; spread of wings 10·7, inhabit Pennsylvania and New York, and probably the southern states.—ARCANA OF SCIENCE, 1833.

(*g*) Ulloa, vol. i. p 58.

the blood at length passes, and that more freely the longer the operation is continued; so that at last, when the bat goes off, the blood continues to flow. In confirmation of this opinion we are told, that where beasts have a thick skin, this animal cannot injure them; whereas, in horses, mules, and asses, they are very liable to be thus destroyed. As to the rest, these animals are considered as one of the great pests of South America; and often prevent the peopling of many parts of that continent: having destroyed at Barja, and several other places, such cattle as were brought there by the missionaries in order to form a settlement.[*]

CHAP. XIX.

AMPHIBIOUS QUADRUPEDS.

The gradations of nature from one class of beings to another are made by imperceptible deviations. As we saw in the foregoing chapters quadrupeds almost degraded into the insect tribe, or mounted among the inhabitants of the air, we are at present to observe their approach to fishes, to trace the degrees by which they become more unlike terrestrial animals, till the similitude of the fish prevails over that of the quadruped.

THE OTTER.[†]—In the first step of the progression from land to amphibious animals, we find the otter, resembling those of the terrestrial kind in shape, hair, and internal conformation; resembling the aquatic tribes in its manner of living, and in having membranes between the toes to assist it in swimming. From this peculiar make of its feet, which are very short, it swims even faster than it runs, and can overtake fishes in their own element. The colour of this animal is brown; and it is somewhat of the shape of an overgrown weasel, being long, slender, and soft skinned. However, if we examine its figure in detail, we shall find it unlike any other animal hitherto described, and of such a shape as words can but weakly convey. Its usual length is about two feet long, from the tip of the nose to the insertion of the tail: the head and nose are broad and flat; the mouth bears some similitude to that of a fish; the neck is short, and equal in thickness to the head; the body long; the tail broad at the insertion, but tapering off to a point at the end; the eyes are very small, and placed nearer the nose than usual in quadrupeds. The legs are very short, but remarkably strong, broad, and muscular: the joints are articulated so loosely, that the animal is capable of turning them quite back, and bringing them on a line with the body, so as to perform the office of fins. Each foot is furnished with five

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[*] Bats.—"Bats seem to be gregarious animals. Vast numbers of them were lately found under the roof of an old building in Richmond Park. I had two sorts of them brought to me, nearly similar in shape, but one considerably larger than another. It is probable that we had formerly a larger breed of bats in this county than we find at present. One of the workmen employed in the remains of Cardinal Wolsey's hall in Hampton Court Palace, brought me the skeleton of a bat, which he found at the end of one of the rafters of the ceiling. The animal when alive must have been as large as a pigeon." The one brought from Richmond Park, Mr. Jesse conceives to be the *Vespertilio altivolans*, mentioned by White in his Selborne. It measured nearly fifteen inches from the tip of one wing to the tip of the other. Its ears were very short, and its fur of a chestnut colour. The place where it was found had a most offensive and noisome smell. These larger bats were quite as numerous as the smaller species. A great number of them were also found in an old building in Coombe Wood, adjoining Richmond Park, and subsequently ten in a decayed tree in that park. This circumstance shows that they do not migrate, as Mr. White thought they did.—Gleanings.

[†] The otter differs in no respect from the weasel kind, except in having the feet webbed, and in living almost constantly in the water, from whence they chiefly derive their food, which is fish.

THE OTTER.

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toes, connected by strong broad webs like those of water-fowl. Thus nature, in every part, has had attention to the life of an animal whose food is fish, and whose haunts must necessarily be about water.[*]

This voracious animal is never found but at the sides of lakes and rivers, but particularly the former, for it is seldom fond of fishing in a running stream, for the current of the water having more power upon it than the fishes it pursues, if it hunts against the stream it swims too slow; and if with the stream, it overshoots its prey. However when in rivers, it is always observed to swim against the stream, and to meet the fishes it preys upon rather than to pursue them. In lakes it destroys much more than it devours, and is often seen to spoil a pond in the space of a few nights. But the damage they do by destroying fish is not so great as their tearing in pieces the nets of the fishers, which they infallibly do whenever they happen to be entangled. The instant they find themselves caught, they go to work with their teeth, and in a few minutes destroy nets of a very considerable value.

The otter has two different methods of fishing; the one by catching its prey from the bottom upward, the other by pursuing it into some little creek, and seizing it there. In the former case, as this animal has longer lungs than most other quadrupeds, upon taking in a quantity of air, it can remain for some minutes at the bottom; and whatever fish passes over it at that time is certainly taken; for as the eyes of fish are placed so as not to see under them, the otter attacks them off their guard from below; and, seizing them at once by the belly, drags them on shore, where it often leaves them untouched, to continue the pursuit for hours together. The other method is chiefly practised in lakes and ponds, where there is no current; the fish thus taken are rather of the smaller kind, for the great ones will never be driven out of deep water.

In this manner the otter usually lives during the summer, being furnished with a supply much greater than its consumption; killing for its amusement, and infecting the edges of the lake with quantities of dead fish, which it leaves there as trophies rather of its victory than its necessities. But in winter, when the lakes are frozen over, and the rivers pour with a rapid torrent, the otter is often greatly distressed for provisions; and is then obliged to live upon grass, weeds, and even the bark of trees. It then comes upon land, and, grown courageous from necessity, feeds upon terrestrial animals, rats, insects, and even sheep themselves. Nature, however, has given it the power of continuing a long time without food; and, although during that season it is not rendered quite torpid, like the marmot or the dormouse, yet it keeps much more within its retreat, which is usually the hollow of a bank worn under by the water. There it often forms a kind of gallery, running for several yards along the edge of the water; so that when attacked at one end, it flies to the other, and often evades the fowler by plunging into the water at forty or fifty paces distance, while he expects to find it just before him.

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[*] THE COMMON OTTER (*Mustela Lutra*) is a very destructive water animal (see text).

> Rapine and spoil
> Haunt e'en the lowest deeps: seas have their sharks;
> Rivers and pools inclose the rav'nous pike,
> He, in his turn, becomes a prey—on him
> Th' amphibious otter feasts.

A variety of this animal is the

SEA OTTER, (*Mustela Lutris*) which is full twice the size of the common otter: the body is very long, and the tail about one third the length of the body. Its skin, shining like velvet, is the most esteemed of all furs, and consequently the most expensive. It assimilates to the seal, to which it bears considerable affinity. It weighs sometimes as much as seventy, or even eighty pounds. It is found, perhaps exclusively, in the northern parts of the Pacific Ocean, where the Asiatic and American continents nearly approach each other, and in the intervening islands. It is said that a single skin is sometimes sold, in the Chinese or Japanese markets, for upwards of twenty pounds sterling. During the winter, the sea otter confines itself to the ice near the sea shore, or to the shore itself; in summer, it ascends the rivers, as far as the fresh water lakes, in company with its single female. The latter is gravid eight or nine months, and brings forth, generally, but one at a birth. They are said to feed on fuci, as well as fish and crustaceous animals, but the teeth do not appear to indicate it.

We learn from Buffon that this animal, in France, couples in winter, and brings forth in the beginning of spring. But it is certainly different with us, for its young are never found till the latter end of summer: and I have frequently, when a boy, discovered their retreats, and pursued them at that season. I am, therefore, more inclined to follow the account given us of this animal by Mr. Lots, of the Academy of Stockholm, who assures us that it couples about the middle of summer, and brings forth, at the end of nine weeks, generally three or four at a time.

In the rivers and the lakes frequented by the otter, the bottom is generally stony and uneven, with many trunks of trees, and long roots stretching underneath the water (*g*) The shore also is hollow and scooped inward by the waves. These are the places the otter chiefly chooses for its retreat; and there is scarce a stone which does not bear the mark of its residence, as upon them its excrements are always made. It is chiefly by this mark that its lurking places are known, as well as by the quantity of dead fish that are found lying here and there upon the banks of the water. To take the old ones alive is no easy task, as they are extremely strong, and there are few dogs that will dare to encounter them. They bite with great fierceness, and never let go their hold when they have once fastened.[*] The best way, therefore, is to shoot them at once, as they never will be thoroughly tamed; and, if kept for the purposes of fishing, are always apt to take the first opportunity of escaping. But the young ones may be more easily taken, and converted to very useful purposes. The otter brings forth its young generally under the hollow banks, upon a bed of rushes, flags, or such weeds as the place affords it in the greatest quantities. I see in the British Zoology a description of its habitation, where that naturalist observes, "that it burrows underground, on the banks of some river or lake, and always makes the entrance of its hole under water, then works up to the surface of the earth, and there makes a minute orifice for the admission of air; and this little air-hole is often found in the middle of some thicket." In some places this may be true, but I have never observed any such contrivance; the retreat, indeed, was always at the edge of the water, but it was only sheltered by the impending bank, and the otter itself seemed to have but a small share in its formation. But, be this as it may, the young ones are always found at the edge of the water; and, if under the protection of the dam, she teaches them instantly to plunge like herself, into the deep, and escape among the rushes or weeds that fringe the stream. At such times, therefore, it is very difficult to take them; for, though ever so young, they swim with great rapidity, and in such a manner that no part of them is seen above water, except the tip of the nose. It is only when the dam is absent that they can be taken; and in some places there are dogs purposely trained for discovering their retreats. Whenever the dog comes to the place, he soon, by his barking, shows that the otter is there; which, if there be an old one, instantly plunges into the water, and the young all follow. But if the old one be absent, they continue terrified, and will not venture forth but under her guidance and protection. In this manner they are secured and taken home alive, where they are carefully fed with small fish and water. In proportion, however, as they gather strength, they have milk mixed among their food, the quantity of their fish provision is retrenched, and that of vegetables is increased, until at length they are fed wholly upon bread, which perfectly agrees with their constitution. The manner of training them up to hunt for fish requires not only assiduity but patience; however, their activity and use, when taught, greatly repays the trouble of teaching; and, perhaps, no other animal is more beneficial to his master. The usual way is, first to teach them to fetch as dogs are instructed; but as they have not the same docility, so it requires more art and experience to teach them. It is usually performed by accustoming them to take a truss stuffed with wool, of the shape of a fish, and made of leather, in their mouths, and to drop it at the word of command; to run after it when thrown forward, and to bring it to their master. From this they proceed to real fish, which are thrown dead into the water, and which they are taught to fetch from thence. From the dead they proceed to the live, until at last the animal is perfectly instructed in the whole art of fishing.

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[*] **Bite of the Otter.**—Some few years ago, the late Mr. Bradshaw, of Hatton Hall, was otter-hunting in the river Lune. After some time, the chase being no longer able to keep the water, left it, and made for the mouth of a sough or drain, a short distance from the river's edge. Several persons were standing near the mouth of the sough, among the rest a mechanic of the name of Slater. The otter was in a fair way of getting in, when Slater seized him by the tail. The animal instantly turned its head, and bit the end of the man's thumb completely off!

One of the workmen belonging to Arrats mill, near Montrose, while walking beside the mill-head, in February, 1825, observed an otter. A little dog belonging to the man, began to bark and approached it, when the otter, making a sudden leap, seized the dog by the back, plunged with it into the water, from which it never rose again.—Ed.

(*g*) Journal Etranger, Juin. 1755, p. 14.

Otters are to be met with in most parts of the world, and rather differ in size and colour from each other, than in habitudes or conformation.(g) In North America and Carolina they are usually found white, inclining to yellow. The Brasilian otter is much larger than ours, with a roundish head, almost like a cat. The tail is shorter, being but five inches long; and the hair is soft, short, and black, except on the head, where it is of a dark brown, with a yellowish spot under the throat.*

THE BEAVER.†—In all countries as man is civilized and improved, the lower ranks of animals are repressed and degraded.(g) Either reduced to servitude, or treated as rebels, all their societies are dissolved, and all their united talents rendered ineffectual. Their feeble arts quickly disappear, and nothing remains but their solitary instincts, or those foreign habitudes which they receive from human education. For this reason there remain no traces of their ancient talents and industry, except in those countries where man himself is a stranger; where, unvisited by his controlling power, for a long succession of ages, their little talents have had time to come to their limited perfection, and their common designs have been capable of being united.

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* The Sea Otter.—The whole length of the sea otter is generally about four feet, of which the tail occupies thirteen inches. The fur is extremely soft, and of a deep glossy black. The ears are small and erect, and the whiskers long and white. The legs are short and thick, the hinder ones something resembling those of a seal. The weight of the largest sea otter is from seventy to eighty pounds. In their general habits of life, these animals are perfectly harmless and inoffensive; and towards their offspring they exhibit degree of attachment which is extremely interesting. They will never desert them; they will even starve themselves to death on being robbed of them, and strive to breathe their last on the spot where their young have been destroyed. The female produces only a single one at a time, which she suckles almost a whole year, and until it takes to itself a mate. The sea otters pair, and are very constant. They often carry their young between their teeth, and fondle them, frequently throwing them up, and catching them again in their paws. Before these can swim, the old ones will take them in their fore feet, and swim about with them on their backs. The sea otters swim sometimes on their sides; at other times on their backs, or in an upright position. They are very sportive, embrace each other, and seem to kiss. When attacked they make no resistance, but endeavour to save themselves by flight: if, however, they are closely pressed, and can see no means of escape, they scold and grin like an angry cat. On receiving a blow, they immediately lie on their side, draw up their hind legs together, cover their eyes with their fore paws, and thus seem to prepare for death. But if they are fortunate enough to escape their pursuer, they deride him as soon as they are safe in the sea.

The skins of the sea otters are of great value, and have long formed a considerable export from Russia. They are disposed of to the Chinese at the rate of eighty or a hundred rubles each. The trade for this fur at Nootka had, not many years ago, nearly produced a war between Great Britain and Spain.

The Cayenne Otter.—The toes on the fore feet are unconnected; the tail is long, taper, and naked. It inhabits Cayenne.

† The Beaver has the front teeth in the upper jaw abruptly cut off, and hollowed out into a transverse angle; those of the lower jaw being transverse at the tips; there are four grinders on each side in each jaw: the tail is long, flattened and scaly; and it has perfect collar bones.

(g) Ray

(g) Buffon.

The beaver seems to be now the only remaining monument of brutal society From the result of its labours, which are still to be seen in the remote parts of America, we learn how far instinct can be aided by imitation. We from thence perceive to what a degree animals, without language or reason, can concur for their mutual advantage, and attain by numbers those advantages which each, in a state of solitude, seems unfitted to possess.

(The Beaver.)

If we examine the beaver merely as an individual, and unconnected with others of its kind, we shall find many other quadrupeds to exceed it in cunning, and almost all in the powers of annoyance and defence. The beaver, when taken from its fellows, and kept in a state of solitude or domestic tameness, appears to be a mild, gentle creature, familiar enough, but somewhat dull, and even melancholy; without any violent passions or vehement appetites, moving but seldom, making no efforts to attain any good, except in gnawing the wall of its prison, in order to regain its freedom; yet this, however, without anger or precipitation, but calm and indifferent to all about, without attachment or antipathies, neither seeking to offend nor desiring to please. It appears inferior to the dog in those qualities which render animals of service to man; it seems made neither to serve, to command, nor to have connexions with any other set of beings, and is only adapted for living among its kind. Its talents are entirely repressed in solitude, and are only brought out by society. When alone, it has but little industry, few tricks, and without cunning sufficient to guard it against the most obvious and bungling snares laid for it by the hunter. Far from attacking any other animal, it is scarce possessed of the arts of defence. Preferring flight to combat, like all wild animals, it only resists when driven to an extremity, and fights only then when its speed can no longer avail.

But this animal is rather more remarkable for the singularity of its conformation than any intellectual superiorities it may be supposed, in a state of solitude, to possess. The beaver is the only creature among quadrupeds that has a flat, broad tail, covered with scales, which serves as a rudder to direct its motions in the water. It is the sole quadruped that has membranes between the toes on the hind feet only, and none on the fore feet, which supply the place of hands, as in the squirrel. In short, it is the only animal that in its fore parts entirely resembles a quadruped, and in its hinder parts seems to approach the nature of fishes, by having a scaly tail. In other respects, it is about two feet long and near one foot high; it is somewhat shaped like a rat, except the tail, which, as has been observed, is flat and scaly, somewhat resembling a neat's tongue at the point. Its colour is of a light brown; the hair of two sorts; the one longer and coarser; the other, soft, fine, short, and silky. The teeth are like those of a rat or a squirrel, but longer and stronger, and admirably adapted to cutting timber, or stripping bark, to which purposes they are constantly applied. One singularity more may be mentioned in its conformation; which is, that like birds, it has but one and the same vent for the emission of its excrements and its urine; a strange peculiarity, but which anatomists leave us no room to doubt of.

The beavers begin to assemble about the months of June and July, to form a society that is to continue for the greatest part of the year. They arrive in numbers from every side, and generally form a company of above two hundred. The place of meeting is commonly the place where they fix their abode, and this is always by the side of some lake or river. If it be a lake in which the waters are always upon a level, they dispense with building a dam; but if it be a running stream, which is subject to floods and falls, they then set about building a dam, or pier, that crosses the river, so that it forms a dead water in that part which lies above and below. This dam, or pier, is often fourscore or a hundred feet long, and ten or twelve feet thick at the base. If we compare the greatness of the work with the powers of the architect, it will appear enormous; but the solidity with which it is built is still more astonishing than its size. The part of the river over which this dam is usually built is where it is most shallow, and where some great tree is found growing by the side of the stream. This they pitch upon as proper for making the principal part in their building; and, although it is often thicker than a man's body, they instantly set about cutting it down. For this operation they have no other instrument but their teeth, which soon lay it level, and that also on the side they wish it to fall, which is always across the stream. They then fall about cutting off the top branches, to make it lie close and even, and serve as the principal beam of their fabric.(*g*)

This dike or causey, is sometimes ten, and sometimes twelve feet thick at the foundation. It descends in a declivity or slope, on that side next the water, which gravitates upon the work in proportion to the height, and presses it with a prodigious force towards the earth. The opposite side is erected perpendicularly like our walls; and that declivity, which, at the bottom or basis, is about twelve feet broad, diminishes towards the top, where it is no more than two feet broad, or thereabouts. The materials whereof this mole consists, are wood and clay. The beavers cut, with surprising ease, large pieces of wood, some as thick as one's arm or one's thigh, and about four, five, or six feet in length, or sometimes more, according as the slope ascends. They drive one end of these stakes into the ground, at a small distance one from the other, intermingling a few with them that are smaller and more pliant. As the water, however, would find a passage through the intervals or spaces between them, and leave the reservoir dry, they have recourse to a clay, which they know where to find, and with which they stop up all the cavities both within and without, so that the water is duly confined. They continue to raise the dike in proportion to the elevation of the water, and the plenty which they have of it. They are conscious likewise that the conveyance of their materials by land would not be so easily accomplished as by water; and, therefore, they take the advantage of its increase, and swim with their mortar on their tails, and their stakes between their teeth, to the places where there is most occasion for them. If their works are, either by the force of the water, or the feet of the huntsmen, who run over them, in the least damnified, the breach is instantly made up; every nook and corner of the habitation is reviewed, and with the utmost diligence and application, perfectly repaired. But when they find the huntsmen visit them too often, they work only in the night-time, or else abandon their works entirely, and seek out for some safer situation.

The dike, or mole, being thus completed, their next care is to erect their several apartments, which are either round or oval, and divided into three stories, one raised above the other: the first below the level of the causey, which is for the most part full of water; the other two above it. This little fabric is built in a very firm and substantial manner, on the edge of their reservoir, and always in such divisions or apartments as above mentioned; that in case of the water's increase, they may move up a story higher, and be no ways incommoded. If they find any little island contiguous to their reservoir, they fix their mansion there, which is then more solid, and not so frequently exposed to the overflowing of the water, in which they are not able to continue for any length of time. In case they cannot pitch upon so commodious a situation,

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(*g*) Spectacle de la Nature.

they drive piles into the earth, in order to fence and fortify their habitation against the wind as well as the water. They make two apertures, at the bottom. to the stream; one is a passage to their bagnio, which they always keep neat and clean; the other leads to that part of the building where every thing is conveyed that will either soil or damage their upper apartments. They have a third opening or doorway, much higher, contrived for the prevention of their being shut up and confined, when the frost and snow have closed the apertures of the lower floors. Sometimes they build their houses altogether upon dry land; but then they sink trenches five or six feet deep, in order to descend into the water when they see convenient. They make use of the same materials; and are equally industrious in the erection of their lodges, as their dikes. Their walls are perpendicular, and about two feet thick. As their teeth are more serviceable than saws, they cut off all the wood that projects beyond the wall. After this, when they have mixed up some clay and dry grass together, they work it into a kind of mortar, with which, by the help of their tails, they plaster all their works, both within and without.

The inside is vaulted, and is large enough for the reception of eight or ten beavers. In case it rises in an oval figure, it is for the generality above twelve feet long, and eight or ten feet broad. If the number of inhabitants increase to fifteen, twenty or thirty, the edifice is enlarged in proportion. I have been credibly informed, that four hundred beavers have been discovered to reside in one large mansion-house, divided into a vast number of apartments, that had a free communication one with another.

All these works, more especially in the northern parts, are finished in August, or September at farthest; at which time they begin to lay in their stores.* During the summer, they are perfect epicures; and regale themselves every day on the choicest fruits and plants the country affords. Their provisions, indeed, in the winter season, principally consist of the wood of the birch, the plane, and some few other trees, which they steep in water, from time to time, in such quantities as are proportioned to the number of inhabitants. They cut down branches from three to ten feet in length. Those of the largest dimensions are conveyed to their magazines by a whole body of beavers; but the smallest by one only: each of them, however, takes a different way, and has his proper walk assigned him, in order that no one labourer should interrupt another in the prosecution of his work. Their wood-yards are larger or smaller, in proportion to the number in family: and, according to the observation of some curious naturalists, the usual stock of timber, for the accommodation of ten beavers, consists of about thirty feet in a square surface, and ten in depth. These logs are not thrown up in one continual pile, but laid one across the other, with intervals or small spaces between them, in order to take out, with the greater facility, but just such a quantity as they shall want for their immediate consumption, and those parcels only which lie at the bottom in the water. and have been duly steeped. This timber is cut again into small particles, and conveyed to one of their largest lodges, where the whole family meet, to consume their respective dividends, which are made impartially, in even and equal portions. Sometimes they traverse the woods, and regale their young with a more novel and elegant entertainment.

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* Ingenuity of a Beaver at Paris.—A beaver from the Rhine is now, or was lately, in the royal collection in the Jardin des Plantes at Paris, which exhibited as much ingenuity as has ever been ascribed to the species in a wild state, and more than enough to silence the incredulity of sceptics respecting the beavers' dams, and their magazines of winter provisions. This beaver, for instance, we are informed by M. Geoffroi St. Hilaire, was, during the severe weather in winter, furnished with fresh twigs of trees, to give exercise to his propensity to gnawing, and with apples, &c. as a more nutritive food. One night there came on a snow storm, and the snow beat into his domicile in considerable quantity, till he found out a plan of shielding himself from the inconvenience For this purpose, he cut his supply of twigs into proper lengths, to be woven in the basket fashion between the bars of his cage; chopped his apples in pieces, to fill up the intervals between the twigs; and, when even this did not appear sufficiently air-tight, or (if you will) storm-tight, he kneaded the snow into the intervals By the morning it appeared that he had laboured hard all night, and had completed a very neat and ingenious barricado against the intrusion of the snow.—Arcana of Science, 1830.

Such as are used to hunt these animals,* know perfectly well, that green wood is much more acceptable to them than that which is old and dry; for which reason they plant a considerable quantity of it round their lodgments; and as they come out to partake of it, they either catch them in snares, or take them by surprise. In the winter, when the frosts are very severe, they sometimes break a large hole in the ice; and when the beavers resort thither for the benefit of a little fresh air, they either kill them with their hatchets, or cover the opening with a large substantial net. After this, they undermine and and subvert the whole fabric: whereupon the beavers, in hopes to make their escape in the usual way, fly with the utmost precipitation to the water; and plunging into the aperture, fall directly into the net, and are inevitably taken.†

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* Beaver Skins.—The flesh of the beaver is very delicious; but it is not so much for this as for its valuable fur that a war of ruthless extermination is carried on against this interesting animal. For the sake of its fur, men, aided by dogs, invade its peaceful habitations, utterly uprooting them, and, if possible, suffering the escape of not a single individual "Of the numbers thus sacrificed," says the highly talented author of the *Gardens Delineated*, "and of the importance of the trade, some idea may be formed by the amount of the sales at various places and at different periods. In 1743, the Hudson's Bay Company alone sold 26,750 skins; and 127,080 were imported into Rochelle; upwards of 170,080 were exported from Canada in 1788; and Quebec alone, in 1808, supplied this country with 126,927, which, at the estimated average of eighteen shillings and ninepence per skin, would produce no less a sum than £118,994 —Religious Tract Society's Natural History.

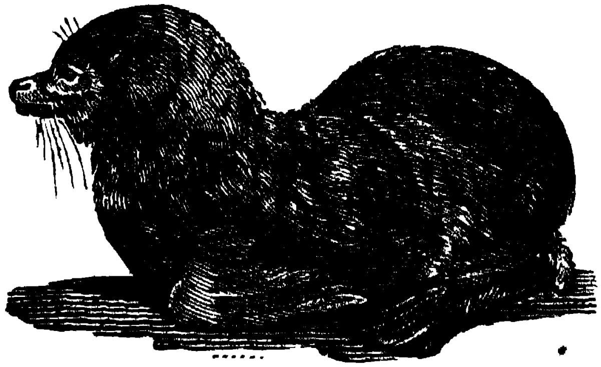
† Beaver Hunters.—The Iroquois are the greatest beaver takers in Canada, and their hunters now allot the beaver districts amongst themselves, and endeavour to preserve these animals from extinction, by trenching the beaver dams of any one quarter only once in four or five years, and taking care to leave always a pair, at least, in a dam to breed. Further north the Indians, when they break up a beaver lodge, destroy, as far as they are able, both young and old, and the number of beavers is consequently now very much reduced. Gangs of Iroquois were also introduced into the fur countries to the north some years ago; and by setting traps, which destroyed indiscriminately beavers of all sizes, they almost extirpated the species from their hunting grounds. The Hudson's Bay Company are, however, endeavouring to remedy this evil, by laying plans to insure an adequate supply of the very useful beaver fur, although it is not likely that it can ever be so plentiful as it was formerly. In the year 1743, the import of beaver skins into the ports of London and Rochelle, amounted to upwards of 150,000; and there is reason to suppose that a considerable additional quantity was at that period introduced illicitly into Great Britain. In 1827, the importation of beaver skins into London, from more than four times the extent of fur country than that occupied in 1743, did not much exceed 50,000.—Richardson's North American Zoology.

Destruction.—The number of beavers killed in North America is exceedingly great even at the present time, after the fur trade has been carried on for so many years, and the most indiscriminate warfare waged uninterruptedly against the species. In the year 1820, 60,000 beaver skins were sold by the Hudson's Bay Company alone.

It is a subject of regret that an animal so valuable and prolific should be hunted in a manner tending so evidently to the extermination of the species, when a little care and management on the part of those interested might prevent unnecessary destruction, and increase the sources of their revenue.

In a few years, comparatively speaking, the beaver has been exterminated in all the Atlantic and in the western states, as far as the middle and upper waters of the Missouri; while in the Hudson's Bay possessions they are becoming annually more scarce, and the race will eventually be extinguished throughout the whole continent.

The Indians inhabiting the countries watered by the tributaries of the Missouri and Mississippi, take the beavers principally by trapping, and are generally supplied with steel traps by the traders, who do not sell, but lend or hire them, in order to keep the Indians dependent upon themselves, and also to lay claim to the furs which they may procure. The business of trapping requires great experience and caution, as the senses of the beaver are very keen, and enable him to detect the recent presence of the hunter by the slightest traces. It is necessary that the hands should be washed clean before the trap is handled and baited, and that every precaution should be employed to elude the vigilance of the animal. The bait which is used to entice



(The Ursine Seal.)

THE SEAL.*—Every step we proceed in the description of amphibious quadrupeds, we make nearer advances to the tribe of fishes. We first observed the otter with its feet webbed, and formed for an aquatic life; we next saw the beaver with the hinder parts covered with scales, resembling those of fishes; and we now come to a class of animals in which the shape and habitude of fishes still more apparently prevail, and whose internal conformation attaches them very closely to the water. The seal, in general, resembles a quadruped in some respects, and a fish in others. The head is round, like that of a man; the nose broad, like that of the otter; the teeth like those of a dog; the eyes large and sparkling; no external ears, but holes that serve for that purpose; the neck is well proportioned, and of a moderate length; but the body thickest where the neck is joined to it. From thence the animal tapers down to the tail, growing all the way smaller, like a fish. The whole body is covered with a thick bristly shining hair, which looks as if it were entirely rubbed over with oil; and thus far the quadruped prevails over the aquatic. But it is in the feet that this animal greatly differs from all the rest of the quadruped kind; for, though furnished with the same number of bones with other quadrupeds, yet they are so stuck on the body, and so covered with a membrane, that they more resemble fins than feet; and might be taken for such, did not the claws with which they are pointed show their proper analogy. In the fore feet, or rather hands, all the arm and the cubit are hid under the skin, and nothing appears but the hand from the wrist downwards; so that if we imagine a child with its arms swathed down, and nothing appearing but its hands at each side of the body, towards the breast, we may have some idea of the formation of this animal in that part. These hands are covered in a thick skin, which serves, like a fin, for swimming; and are distinguished by five claws, which are long, black, and piercing. As to the hind feet, they are stretched out on each side of the short tail, covered with a hairy skin like the former, and both together almost joining at the tail; the whole looks like the broad flat tail of a fish; and, were it not for five claws which appear, might be considered as such. The dimensions of this animal are various, being found from four feet long to nine. They differ also in their colours: some being black, others spotted, some white, and many more yellow.

The water is the seal's usual habitation, and whatever fish it can catch, its food. Though not equal in instinct and cunning to some terrestrial animals, it is greatly superior to the mute tenants of that element in which it chiefly resides. Although it can continue for several minutes under water, yet it is not

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the beavers is prepared from the substance called castor (*castoreum*) obtained from the glandulous pouches of the male animal, which contain sometimes from two to three ounces.

Anecdote.—The young beavers whine in such a manner as closely to resemble the cry of a child. Like the young of most other animals they are very playful, and their movements are peculiarly interesting. "One day a gentleman, long resident in the Hudson's Bay Country, espied five young beavers sporting in the water, leaping upon the trunk of a tree, pushing one another off, and playing a thousand interesting tricks. He approached softly under cover of the bushes, and prepared to fire on the unsuspecting creatures, but a nearer approach discovered to him such a similitude between their gestures and the infantile caresses of his own children, that he threw aside his gun, and left them unmolested."—Franklin.

* Seals have six pointed parallel teeth in the upper jaw, the outer ones of which are larger; there are five grinders on each side above, and six below, all of which have three knobs; the hind feet are united into a kind of fin

able, like fishes, to remain there for any length of time; and a seal may be drowned like any other terrestrial animal. Thus it seems superior in some respects to the inhabitants of both elements, and inferior in many more. Although furnished with legs, it is in some measure deprived of all the advantages of them.(g) They are shut up within its body, while nothing appear but the extremities of them, and these furnished with very little motion, but to serve them as fins in the water. The hind feet, indeed, being turned backwards, are entirely useless upon land; so that when the animal is obliged to move, it drags itself forward like a reptile, and with an effort more painful. For this purpose it is obliged to use its fore feet, which, though very short, serve to give it such a degree of swiftness, that a man cannot readily overtake it; and it runs towards the sea. As it is thus awkwardly formed for going upon land, it is seldom found at any distance from the sea-shore, but continues to bask upon the rocks, and when disturbed, always plunges down at once to the bottom.

The seal is a social animal, and, wherever it frequents, numbers are generally seen together.* They are found in every climate, but in the north and icy seas they are particularly numerous. It is on those shores, which are less inhabited than ours, and where the fish resort in greater abundance, that they are seen by thousands, like flocks of sheep, basking off the rocks, and suckling their young. There they keep watch like other gregarious animals; and, if an enemy appear, instantly plunge altogether into the water. In fine weather they more usually employ their time in fishing; and generally come on shore in tempests and storms. The seal seems the only animal that takes delight in these tremendous conflicts of nature. In the midst of thunders and torrents, when every other creature takes refuge from the fury of the elements, the seals are seen by thousands sporting along the shore, and delighted with the universal disorder. This, however, may arise from the sea being at that time too turbulent for them to reside in; and they may then particularly come upon land, when unable to resist the shock of their more usual element.

As seals are gregarious, so they are also animals of passage, and perhaps the only quadrupeds that migrate from one part of the world to another. The generality of quadrupeds are contented with their native plains and forests, and seldom stray, except when necessity or fear impels them. But seals change their habitation; and are seen in vast multitudes directing their course from one continent to another.(g) On the northern coasts of Greenland they are seen to retire in July, and to return again in September. This time it is supposed they go in pursuit of food. But they make a second departure in March to cast their young, and return in the beginning of June, young and all, in a great body together, observing in their route a certain fixed time and track, like birds of passage. When they go upon this expedition, they are seen in great droves, for many days together, making towards the north, taking that part of the sea most free from ice, and going still forward into those seas where man cannot follow. In what manner they return, or by what passage, is utterly unknown; it is only observed, that when they leave the coasts to go out upon this expedition, they are all extremely fat, but on their return they come home excessively lean.

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* LOVE OF MUSICAL SOUNDS.—The seal, though the ears are cropped close to the head, has a most delicate sense of hearing, and delights in musical sounds: this fact was not unknown to the ancients. Laing, in his account of a voyage to Spitzbergen, states that a numerous auditory of seals would surround the vessel and follow it for miles when the violin (as was often the case) was played on deck. And the late Sir Walter Scott, in allusion to this singular trait in the nature of the animal, says,

> "Rude Heiskar's seals, through surges dark,
> Will long pursue the minstrel's bark."

Among many instances of the domestication of the seal, and its use in fishing, we select the following anecdote, with which we close our account. "In January 1819, a gentleman in the neighbourhood of Burntisland, county of Fife, Scotland, completely succeeded in taming a seal. Its singularities attracted the curiosity of strangers daily. It appeared to possess all the sagacity of a dog, lived in its master's house, and ate from his hand. In his fishing excursions, this gentleman generally took it with him, when it afforded no small entertainment. If thrown into the water, it would follow for miles the track of the boat; and, though thrust back by the oars, it never relinquished its purpose. Indeed it struggled so hard to regain its seat, that one would imagine its fondness for its master had entirely overcome the natural predilection for its native element."—RELIGIOUS TRACT SOCIETY'S NATURAL HISTORY.

(g) Buffon.

(g) Krantz, vol. i. p. 129.

The females in our climate bring forth in winter, and rear their young upon some sand-bank, rock, or desolate island, at some distance from the continent. When they suckle their young, they sit up on their hinder legs, while these, which are at first white with woolly hair, cling to the teats, of which there are four in number, near the navel.(g) In this manner the young continue in the place where they are brought forth, for twelve or fifteen days; after which the dam brings them down to the water, and accustoms them to swim and get their food by their own industry. As each litter never exceeds above three or four, so the animal's cares are not much divided, and the education of her little ones is soon completed. In fact, the young are particularly docile; they understand the mother's voice among the numerous bleatings of the rest of the old ones, they mutually assist each other in danger, and are perfectly obedient to her call.* Thus early accustomed to subjection, they continue to live in society, hunt and herd together, and have a variety of tones, by which they encourage to pursue, or warn each other of danger. Some compare their voices to the bleating of a flock of sheep, interrupted now and then by the barking of angry dogs, and sometimes the shriller notes of a cat.(g) All along the shore, each has its own peculiar rock, of which it takes possession, and where it sleeps when fatigued with fishing, uninterrupted by any of the rest. The only season when their social spirit seems to forsake them, is that when they feel the influences of natural desire. They then fight most desperately; and the male that is victorious, keeps all the females to himself. Their combats on these occasions are managed with great obstinacy, and yet great justice: two are never seen to fall upon one together; but each has its antagonist, and all fight an equal battle, till one alone becomes victorious.

We are not certainly informed how long the females continue pregnant; but if we may judge from the time which intervenes between their departure from the Greenland coasts and their return, they cannot go above seven or eight months at the farthest.*

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* Domestication of Animals.—It appears that what we call the domestication of animals, consists in our becoming members of the society which these animals form among themselves. Man becomes the chief of its herd; from the moment that an animal admits man as a member of its society, it is domesticated,—"as a man could not enter into such society without becoming the chief of it." Applying these principles to wild animals, the apes and monkeys, notwithstanding their social instinct and intellect, are yet so violent and irritable, as to be incapable of all useful subjection. Among carnivorous animals, the seals, together with the various species of the dog tribe, would be the best adapted to attach themselves to us, and serve us. M. Cuvier suggests, that the seal might be trained for fishing, as the dog is for hunting. Several animals peculiar to South America, having but very feeble means of defence, will, as that country is peopled, gradually disappear from the face of the earth. After other illustrations, the writer concludes, that all domestication is founded on the propensity which animals have to live together in herds, and to attach themselves to one another. "We obtain it only by enticement, and principally by augmenting their wants, and satisfying them. But we could only produce domestic individuals, and not races, without the concurrence of one of the most general laws of life, the transmission of the organic or intellectual modifications by generation. Here one of the most astonishing phenomena of nature manifests itself to us, the transformation of a fortuitous modification into a desirable form; of a fugitive want into a fundamental propensity; of an incident habit into an instinct. This subject is assuredly worthy of exciting the attention of the most accurate observers, and of occupying the meditations of the most profound thinkers.—Arcana of Science, 1829.

(g) Coeunt in littore resupinata femina.—Lin. Syst.

(g) Linnæi Syst.

The seal is taken for the sake of its skin, and for the oil its fat yields. The former sells for about four shillings; and, when dressed, is very useful in covering trunks, making waistcoats, shot-pouches, and several other conve-

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* PROBOSCIS SEAL.—Numerous herds of these seals inhabit the land of Kerguelen, the Island of Georgia, and the land of the States, where the English habitually maintain their fishery of these animals. They exist in great numbers on the Island of Juan Fernandez. It is probable that the small fresh-water lakes in which these seals delight to bathe, may induce their preference for particular spots; but from all the observations that have hitherto been made, these powerful animals are confined between the 35th and 55th degrees of south latitude, inhabiting the Atlantic and the great Southern Ocean.

Besides choosing some islands by preference, these seals also change their residence at particular seasons, they are in fact migratory animals. Equally obnoxious to extreme heat as to severe cold, they advance with the winter season from the south to the north and return with summer in the contrary direction. It is in the middle of June that they perform their first migration, covering, in countless multitudes, the shores of King's Island, which sometimes, the English sailors say, are blackened by them. The same migratory movements have been remarked by Rogers and Steller in other species of seals, which they have compared, in that respect, to swans, wild geese &c

A month after their arrival, the females bring forth, at this period they are surrounded by the males, which prevent their return to the sea, and even compel them to remain on shore, until the period of suckling their young is ended Nay, it is asserted that when the mothers, wearied of this confinement, endeavour to drive away their offspring, the males bite the young ones, and compel them to return. The female has but one young, which measures, when born, from four to five feet in length, and weighs about seventy pounds; the males are already larger than the females.

The mother turns on her side to give suck to the young. Lactation lasts seven or eight weeks, during which period the females, guarded as above mentioned, neither eat nor come down to the sea. This strange abstinence did not escape the observation of the unfortunate Alexander Selkirk, who informed Captain Rogers, that towards the end of the month of June these animals visited his solitary abode, bringing forth their young about a musket-shot from the sea, and staying to the end of September, without shifting their place, or taking any kind of nourishment during all that time Forster relates the same circumstance, and adds, that towards the latter end of their fast, when they have become extremely emaciated, they swallow a considerable quantity of stones, to keep their stomachs distended The growth of the young is extremely rapid; at the end of eight days it weighs 100lbs. So considerable an increase can only take place at the expense of the parent, for she does not repair by any kind of food the loss of the nutritious substance which she has supplied. Hence she visibly grows lean; some have even been observed to perish during this painful lactation: but it is, of course, uncertain whether an internal malady might not have been the cause.

At the end of fifteen days the milk teeth appear, and are completed in four months. The stages of growth follow so rapidly, that in three years the young animals have acquired a length of from eighteen to five and twenty feet, which is the ordinary limit of their growth in this direction; they afterwards increase only in breadth At this period the young males first acquire the proboscis

At the age of six or seven weeks the young ones are conducted to the water, the shores are then abandoned for some time, the whole herd row together, if we may so express ourselves The manner of swimming of these mammalia is rather slow, they are forced, at very short intervals, to come to the surface of the water to breathe the air, which is essential to their existence. It is observed that when any of the young seals separate from the herd they are immediately pursued by some of the old ones, who compel them, by biting, to return to the family group.

After having remained three weeks or a month at sea, both to familiarize the young ones with that element, and to repair the powers that have been exhausted by a long abstinence, the sea-elephants return a second time to the shore, and the work of reproduction recommences.

At this period the males have furious and bloody combats, but always individual against individual Their manner of fighting is remarkable The two colossal rivals drag themselves heavily along, they meet, muzzle to muzzle; they raise the whole of the fore part of the body on their flippers; they open wide their enormous mouth; their eyes are inflamed with fury: thus prepared, they drive themselves furiously against each other, and falling together with the shock, teeth to teeth, and jaw to jaw, they reciprocally inflict severe lacerations, sometimes the eyes are torn out niencies. The flesh of this animal formerly found place at the tables of the great. At a feast provided by Archbishop Nevill, for Edward the Fourth, there were twelve seals and porpoises provided, among other extraordinary rarities.*

of their sockets in this conflict; still more frequently they loose their tusks; blood flows abundantly; but the obstinate combatants, without appearing to feel their wounds, continue the fight until their powers are completely exhausted. It is rare to see one left dead on the field of battle, for their wounds are observed to heal with inconceivable promptitude. The English sailors attribute this to some peculiar qualities of the blubber, the natural salve; but it probably results from the obvious influence this substance must have in excluding the air from the wounds, and in arresting the bleeding.

During these murderous conflicts, the females remain indifferent spectators to the rage they have excited, and submit to the conqueror, who assumes the mastership of the herd. The sailors call him the Bashaw, comparing him to the jealous and despotic master of a Turkish harem.

The sun now approaching the antarctic hemisphere, the heat increases, and the whole herd resumes the route to the southward, there to remain till the return of frost compels them again to resort to the more temperate coasts of the Isle of King Some individuals, however, are observed to stay there throughout the summer; but whether detained by infirmity, or loss of strength necessary for an extensive navigation, or by some other disposition which renders a greater degree of heat essential to them, is uncertain.

The great migrations of the sea-elephant, however remarkable they may be, are not peculiar to this species; the habit probably obtains with every tribe of seals. Influenced by the same wants, these voyages take place in both hemispheres at analogous periods, and in this respect the conformity of habits is so great between the seals of the north observed by Steller, and those we have been describing, as to render it probable that these migrations are the same in all the amphibious mammalia.—P[illegible]on et Le Sueur.

* Habits and Uses of Seals.—The brain of this animal, observes Dr. Harwood, (at a recent meeting of the Royal Institution,) is, I think, doubtless, of greater proportionate magnitude than any other quadruped, and, not only does it exhibit in its countenance, the appearance of sagacity, but its intelligence is in reality far greater than in most land quadrupeds: hence its domestication is rendered much easier than that of other animals, and it is susceptible of more powerful attachment. The large seal, which was exhibited some time ago at Exeter 'Change, appeared to me to understand the language of its keeper as perfectly as the most faithful dog. When he entered at one end of its long apartment, it raised its body from the water, in which it was injudiciously too constantly kept, supporting itself erect against the bar of its inclosure, and whenever he moved, keeping its large dark eyes steadfastly fixed upon him. When desired to make obeisance to visiters, it quickly threw itself on one side, and struck the opposite one several times in quick succession with its fore foot, producing a loud noise. The young seal, again, which was kept on board the Alexander, in one of the northern expeditions, became so much attached to its new mode of life, that after being thrown into the sea, and it had become tired of swimming at liberty, it regularly returned to the side of the boat, to be retaken on board. Such examples might be greatly multiplied; and I cannot help stating, that aware of this disposition to become familiar, and this participation in the good qualities of the dog, it is astonishing that mankind have not chosen this intellectual and finely organized quadruped for aquatic services scarcely less important than some of those in which the dog is employed on the surface of the land.

The benefits which the inhabitants of frigid regions derive from seals are far too numerous and diversified to be particularized, as they supply them with almost all the conveniences of life. We, on the contrary, so persecute this animal, as to destroy hundreds of thousands annually, for the sake of the pure and transparent oil with which the seal abounds: 2ndly, for its tanned skin, which is appropriated to various purposes by different modes of preparation; and 3rdly, we pursue it for its close and dense attire. In the common seal, the hair of the adult is of one uniform kind, so thickly arranged and imbued with oil, as to effectually resist the action of water; while, on the contrary, in the antarctic seals it is of two kinds: the longest, like that of the northern seals; the other, a delicate, soft fur, growing between the roots of the former, close to the surface of the skin, and not seen externally; and this beautiful fur constitutes an article of very increasing importance in commerce; but not only does the clothing of the seal vary materially in colour, fineness, and commercial situation, in the different species, but not less so in the age of the animal. The young of most kinds are usually of a very light colour, or entirely white, and are altogether destitute of true hair, having this substituted by a long and particularly soft fur.—Arcana of Science, 1828.

As a variety of this animal, we may mention the Sea Lion, described in Anson's Voyages. This is much larger than any of the former; being from eleven to eighteen feet long. It is so fat that, when the skin is taken off, the blubber lies a foot thick all round the body. It seems to differ from the ordinary seal, not only in its size, but also in its food: for it is often seen to graze along the shore, and to feed upon the long grass that grows up along the edges of brooks. Its cry is very various, sometimes resembling the neighing of a horse, and sometimes the grunting of the hog. It may be regarded as the largest of the seal family.*

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* Nose of the Seal.—The nose of the seal is considered by physiologists to be the most perfect nose belonging to the class of quadrupeds. Sir B. Harwood has computed that the smelling surface in the nose of a single seal amounts to the enormous quantity of 240 square inches - Arcana of Science, 1830.

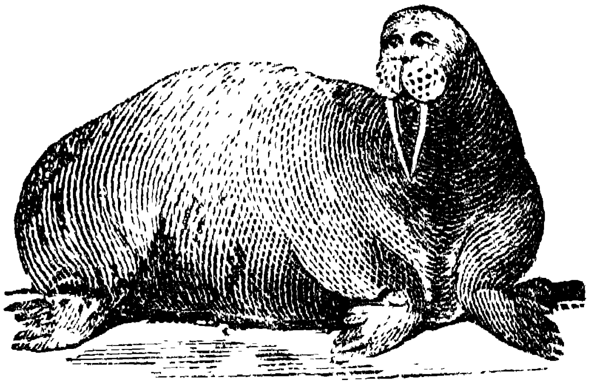
Sea Elephants and Sea Lions.—The amphibious animals of South America have been hitherto the only production which foreigners have turned to advantage. Among these the sea-elephant ought to have the first place. The male of that species, when it has attained its full bulk, is from seven to seven and a half varas in length, and from five to five and a half in circumference. The females never exceed four varas in length, with proportionate thickness. Its formation is like that of the rest of the phoca genus, differing only in the head, which is smaller in proportion. The large males go out on the beach in August, September, and October, sooner or later, according as the spring has been more or less cold. At their cry the females assemble in a gang around the strongest male, and, if any rival comes, they fight terribly, until the one overcome again betakes himself to the sea. The females produce on land, during these months, one, but rarely two young, which at first are black and retain that colour three weeks or a month, during which time they suck. Afterwards they change their hair to a dark grey; they are then abandoned by their mothers, who rut, become with cub again, and betake themselves to the sea, as well as the large males. The young ones go in gangs of from fifty to sixty, and always remain two months on the shore. The males and females of a year old quit the sea in November and December, change their hair, and remain a month, or a month and a half on shore. During the rest of the year, some of them quit the sea, but in small numbers, and in general lean. It is worthy of remark, that while these animals remain out of the sea, which sometimes is for the space of from two months and a half to three, they eat nothing.

The killing of these animals commences with the first, which leave the sea in September. The fishermen, armed with spears, approach a gang. The females, which are sometimes at a distance from the males, draw near to him, in order that he may defend them. He rises on his fins, shows his tusks, and makes a horrible noise, but all in vain; his weight renders his strength useless, and the fishermen pierce him with their spears in the breast. If at first he does not fall, finding himself wounded, he covers the wound with a fin, going backwards till he dies. The females crowd together, and as they offer no resistance, the business of death is soon over with the whole group. The fat is found between the skin and the flesh, and is sometimes six inches thick; and the blubber is extracted by frying the fat. The skin is of no use whatever. Some elephants have yielded as much as two pipes of blubber.

The sea-lion, or pelucon, is from four to five varas in length, with a head more bulky, in proportion, than the elephant. The males have a mane, and as they are infinitely more nimble than the elephants, and it is dangerous to attack them with spears, they are generally killed with fire-arms. In their manner of living they resemble the elephants last mentioned, only with this difference, that they go more frequently into the sea. As the sea-lions have but very little fat, and their skin is of inconsiderable value, they are not persecuted, and are, therefore, very numerous. Some of them go from the sea to the smooth headlands on the banks of the North; but their principal rendezvous is on the shores of the South, in the vicinity of San Antonio and San José.

The sea-wolf, with two kinds of hair, is a vara and a half in length; and has a dark grey fur, long and coarse, which covers another that is very fine; and it is this that makes it valuable. Their manner of living is the same as that of the lions. They are killed with sticks; but, having been very much persecuted, they have become extremely fierce; and on the least alarm they plunge into the sea, not rising again for the distance of more than half a league. At present there are some of them in the bay of Buenos Cables, to the North of the river Negro, and in some places between San Antonio and San José.

The sea-wolf, with one kind of hair, is somewhat larger than the former: it has only one sort of fur, very ordinary and dark grey. As they are of no value, they are left unmolested, and are therefore not so fierce as the others. - Account of Rio de la Plata.



(The Morse.)

THE MORSE.—The Morse is an animal of the seal kind; but differing from the rest in a very particular formation of the teeth, having two large tusks growing from the upper jaw, shaped like those of an elephant, but directed downwards; whereas, in the elephant, they grow upright, like horns; it also wants the cutting teeth, both above and below: as to the rest, it pretty much resembles a seal, except that it is much larger, being from twelve to sixteen feet long. The morses are also generally seen to frequent the same places that seals are known to reside in; they have the same habitudes, the same advantages, and the same imperfections. There are, however, fewer varieties of the morse than the seal, and they are rarely found, except in the frozen regions near the pole. They were formerly more numerous than at present; and the savage natives of the coast of Greenland destroyed them in much greater quantities before those seas were visited by European ships upon the whale-fishery, than now. Whether these animals have been since actually thinned by the fishers, or have removed to some more distant and unfrequented shores, is not known; but certain it is, that the Greenlanders, who once had plenty, are now obliged to toil more assiduously for subsistence; and as the quantity of their provisions decrease, for they live mostly upon seals, the numbers of that poor people are every day diminishing. As to the teeth, they are generally from two to three feet long; and the ivory is much more esteemed than that of the elephant, being whiter and harder. The fishers have been known formerly to kill three or four hundred at once, and along those shores where they chiefly frequented, their bones are still seen lying in prodigious quantities. In this manner a supply of provisions, which would have supported the Greenland nation for ages, has been, in a few years, sacrificed to those who did not use them, but who sought them for the purposes of avarice and luxury.*

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* Sea-Horse.—In the end of December 1817, a large unknown marine animal was seen near the mouth of Loch Seaforth, an arm of the sea which separates the islands of Lewis and Harris. A few days afterwards it was discovered by some of the inhabitants, lying upon a small rock at the Sound of Stockness, on the east coast of Harris. One of them, an expert marksman, prevailed upon the rest to venture out with a boat, in order to attack it. He landed upon another small rock, near that on which the animal was reposing, and taking a deliberate aim, discharged his musket at it. The animal immediately plunged into the sea, to appearance unhurt; but keeping its head and part of its body above the water, presented an opportunity of lodging two other shots, the last of which, passing through the chest, proved fatal. It was then secured, by fixing a rope to its tusks, and dragged ashore. It proved to be the *Sea-Horse* or *Morse*. It was upwards of ten feet in length, and two barrels of blubber were obtained from it. The tusks were about nine inches in length. The inhabitants considered it as a supernatural being, adapting it to the ideas which they usually associate with the *Each Uisg* (Water Horse), an imaginary entity, and the *Seilch Uisg*, an animal supposed, and asserted by people in other matters not unworthy of credit, to have been seen on several lakes in Harris and Lewis. The largest and most perfect specimen of the sea-horse in any collection in Europe, is that in the College Museum, in Edinburgh, which was presented by Captain Scoresby.—Ed.

The Morse.—The seals and morses come during the summer heat into the seas near the Bay of Horisont and that of Klock, in troops of eighty, a hundred, and even two hundred, especially the morses, which remain there many days, until hunger forces them back into the main ocean. Many morses are seen towards Spitzberg. On land they are killed with lances. They are hunted for their tusks and fat. The oil is nearly as much esteemed as that of the whale. Their tusks are also very valuable. The interior of these teeth is considered more valuable than ivory.

THE MANATI.—We come, in the last place, to an animal that terminates the boundary between quadrupeds and fishes. Instead of a creature preying among the deeps, and retiring upon land for repose or refreshment, we have here an animal that never leaves the water, and is enabled to live only there.

The Manati is somewhat shaped in the head and the body like the seal: it has also the fore legs or hands pretty much in the same manner, short and webbed, but with four claws only. these also are shorter in proportion than in the former animal, and placed nearer the head; so that they can scarcely assist its motions upon land. But it is in the hinder parts that it chiefly differs from all others of the seal kind; for the tail is perfectly that of a fish, being spread out broad like a fan, and wanting even the vestiges of those bones which make the legs and feet in others of its kind. The largest of these are about twenty-six feet in length; the skin is blackish, very tough and hard; when cut, as black as ebony; and there are a few hairs scattered, like bristles, of about an inch long. The eyes are very small, in proportion to the animal's head; and the ear holes for it has no external ears, are so narrow as scarce to admit a pin's head. The tongue is so short, that some have pretended it has none at all; and the teeth are composed only of two solid white bones, running the whole length of both jaws, and formed merely for chewing, and not tearing its vegetable food. The female has breasts placed forward, like those of a woman, and she brings forth but one at a time. this she holds with her paws to her bosom: there it sticks, and accompanies her wherever she goes.

This animal can scarcely be called amphibious, as it never entirely leaves the water, only advancing the head out of the stream, to reach the grass on the river sides. Its food is entirely upon vegetables; and, therefore, it is never found far in the open sea, but chiefly in the large rivers of South America; and often above two thousand miles from the ocean. It is also found in the seas near Kamtschatka, and feeds upon the weeds that grow near the shore. There are likewise level greens at the bottom of some of the Indian bays, and there the manatees are harmlessly seen grazing among turtles and other crustaceous fishes, neither giving nor fearing any disturbance. These animals, when unmolested, keep together in large companies, and surround their young ones.(g) They bring forth most commonly in autumn; and it is supposed they go with young eighteen months, for the time of generation is in spring.

The manati has no voice nor cry, for the only noise it makes, is by fetching its breath. Its internal parts somewhat resemble those of a horse, its intestines being longer, in proportion than those of any other creature, the horse only excepted.

The fat of the manati, which lies under the skin, when exposed to the sun, has a fine smell and taste, and far exceeds the fat of any sea animal; it has this peculiar property, that the heat of the sun will not spoil it, nor make it grow rancid; its taste is like the oil of sweet almonds; and it will serve very well, in all cases, instead of butter: any quantity may be taken inwardly with safety, for it has no other effect than keeping the body open. The fat of the tail is of a harder consistence; and, when boiled, is more delicate than the former. The lean is like beef, but more red; and may be kept a long while, in the hottest days, without tainting. It takes up a long time in boiling, and, when done, eats like beef. The fat of the young ones is like pork: the lean is like veal; and, upon the whole, it is very probable that this animal's flesh somewhat resembles that of turtle; since they are fed in the same element, and upon the

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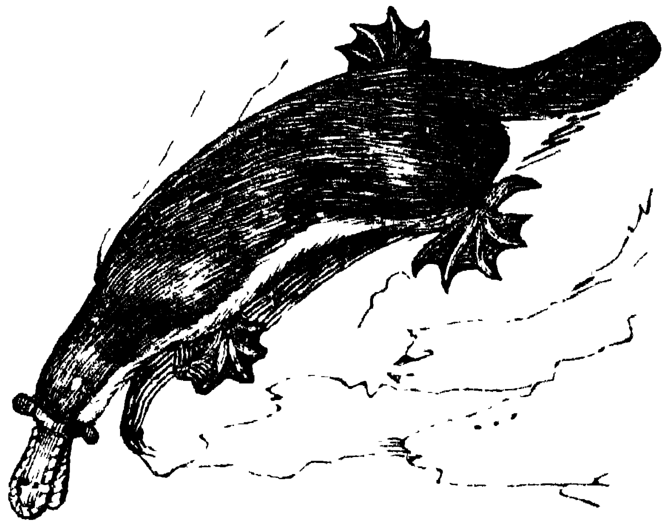
A moderate sized tusk weighs three pounds, and a common morse will furnish half a ton of oil. When one of these animals is encountered on the ice or in the water, the hunters strike him with a strong harpoon, made expressly for the purpose, which will often glide harmlessly over his thick and hard skin. When it penetrates, the animal is drawn towards the vessel with a cable, and then killed with a lance peculiarly formed. He is then dragged to the nearest land, or flat iceberg. They then flay him, throw away the skin, separate the two tusks from the head, or simply cut the head off, cut out the fat, and carry it to the vessel.—ZORGDRAGER'S TRAVELS.

(g) Acta Petropolitana.

very same food. The turtle is a delicacy well known among us: our luxuries are not as yet sufficiently heightened to introduce the manati, which, if it could be brought over, might singly suffice for a whole corporation.

THE PLATYPUS.—Of all the treasures in natural history with which the new world is gradually enriching our stock, it is probable that none has yet been discovered differing so much in its general appearance from every other known quadruped, as the Duck-billed Platypus. It is a native of New Holland, and was first described by Dr. Shaw, in his Natural Miscellany, from a specimen in the possession of Mr. Dobson.


(The Red Platypus.)

Of all the mammalia yet known it seems the most extraordinary in its conformation; exhibiting the perfect resemblance of the beak of a duck, engrafted on the head of the quadruped. So accurate is the similitude that, at first view, it naturally excites the idea of some deceptive preparation by artificial means: the very epidermis, proportion, seratures, manner of opening, and other particulars of the beak of a shoveller, or the broad-billed species of duck, presenting themselves to the view; nor is it without the most minute and rigid examination, that we can persuade ourselves of its being the real beak or snout of a quadruped. The body is depressed, and has some resemblance to that of an otter in miniature; it is covered with a very thick, soft, and beaver-like fur; and is of a moderately dark brown above, and of a somewhat ferruginous white beneath; the head is flattish, and rather small than large; the mouth or snout, as before observed, so exactly resembles that of some broad-billed species of duck, that it might be mistaken for such; round the base is a flat circular membrane, somewhat deeper or wider below than above, viz. below near the fifth of an inch, and above an eighth. The tail is flat, furry like the body, rather short and obtuse, with an almost bifid termination: it is broader at the base, and gradually lessens to the tip, and is about three inches in length; its colour is similar to that of the body. The length of the whole animal, from the tip of the beak to that of the tail, is thirteen inches; of the beak an inch and a half; the legs are very short, terminating in a broad web, which on the fore feet extend to a considerable distance beyond the claws, but on the hind feet reaches no farther than the roots of the claws. On the fore feet are five claws, straight, strong, and sharp pointed; the two exterior ones somewhat shorter than the three middle ones. On the hind feet are six claws, longer and more inclined to a curved form than those of the fore feet; the exterior toe and claw are considerably shorter than the four middle ones. All the legs are hairy above; the fore feet are naked both above and below; but the hind feet are hairy above and naked below. The nostrils are small and round, and are situated about a quarter of an inch from the tip of the bill, and are about the eighth of an inch distant from each other. There is no appearance of teeth; the palate is removed, but seems to have resembled that of a duck; the tongue also is wanting in the specimen. There are no external ears; the auditory foramina are placed about half an inch beyond the eyes. On the upper part of the head, on each side, a little beyond the beak, are situated two small oval spots, in the lower parts of which are imbedded the eyes, or parts of vision.

When we consider the general form of the animal, and particularly its bill and webbed feet, we shall readily perceive that it must be a resident in watery situations; that it has the habit of digging or burrowing in the banks of rivers, or under ground; and that its food consists of aquatic plants and insects. This quadruped verifies in a most striking manner the observation of Buffon, "that whatever was possible for nature to produce has actually been produced."*

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* Habits and Economy of the Ornithorhynchus.—In an account of the habits of this creature by a gentleman who has had many opportunities of investigating them, and which was lately read before the Meeting of Science and Correspondence of the Zoological Society, we are informed that the spot it chooses for its burrow is the bank of a river "where the water is *deep and sluggish*, and the bank *precipitous* and *covered* with *reeds*, or *overhung* with *trees*. Considerably *below* the stream's surface is the main entrance to a narrow passage, which leads directly into the bank bearing away from the river at a right angle to it, and gradually rising above its highest water-mark. At the distance of some few yards from the river's edge, this passage branches into two others, which, describing each a circular course to the right and left, unite again in the nest itself, which is a roomy excavation lined with leaves and moss, and situated seldom more than *twelve yards* from the water, or less than *two feet* beneath the surface of the earth." Here it brings up its young, safe in its inaccessible retreat from the eyes of the curious.

Similar as is the ornithorhynchus in many points of its outward structure to the bird, it also exhibits certain analogies in its internal conformation. Without entering into anatomical details, we may state that it is yet a matter of doubt whether or not it produces eggs, from which its young are afterwards hatched. That it does not produce its young as mammiferous animals in general is universally allowed; but whether it be truly *oviparous*, (that is, producing eggs which are afterwards hatched,) or *ovoviviparous*, (that is, producing eggs which are hatched before exclusion, as is the case with the common viper, *Vipera Berus*, Daud.,) is yet a disputed point. In a communication from Lieut. Maule to the committee above alluded to, and read at a subsequent meeting, that gentleman states, that in several nests, with labour and difficulty discovered, "no eggs were found in a perfect state, but pieces resembling egg-shell were picked out of the *debris* of the nest. In several female platypi which we shot, eggs were found of the size of a large musket-ball and downwards, imperfectly formed however, that is, without the hard outer shell." . . . . "An old female, which lived two weeks in captivity with a young one, being killed by accident on the fourteenth day after her capture, and being skinned while yet warm, it was observed that milk oozed through the fur on the stomach, though no teats were visible on the most minute inspection; but on proceeding with the operation, *two canals* were discovered containing milk, and leading to a large *glandular apparatus*."

These canals, however, as has been recently ascertained by minute dissection, are not single; but on each side there is a bundle of small capillary tubes, united so as to form a short cord; these fine tubes open in a dark coloured circle on the skin, but which is covered by the fur, the glandular mass from which they proceed being of large size, compressed, extending nearly the whole length of the body, and lying immediately beneath the skin. From the collective evidence we have been able to obtain, as well as from some circumstances connected with its anatomy, we are strongly disposed to believe that the ornithorhynchus is *ovoviviparous*, or, in other words, that the young are indeed hatched from eggs, but hatched before their birth, when they are extremely small, and that their nutriment is the fluid prepared in the large mammary gland, and which the mother has most probably the means of instilling into the mouth of its helpless offspring. Such is the mystery which yet hangs over this extraordinary creature; an animal which seems as if expressly made to show how multiform and inexhaustible are the resources of the almighty Creator; nor can we help remarking, that it appears to form a link between the more perfect mammalia and the feathered race, uniting the forms and characters of each in its own structure, so as to be in truth a *paradox*.—Religious Tract Society's Natural History.

Ornithorhynchi.—September 11.—Dr. Weatherhead communicated to the Committee several extracts from a letter which he had recently received from Lieutenant the Honourable Lauderdale Maule, of the 39th Regiment, now in New South Wales. They referred to the habits and economy of the *Ornithorhynchi*.

"During the spring of 1831," writes Lieutenant Maule, "being detached in the interior of New South Wales, I was at some pains to discover the truths of the generally accepted belief, namely, that the female *Platypus* lays eggs, and suckles its young.

"By the care of a soldier of the 39th Regiment, who was stationed at a post on the Fish River, a mountain stream abounding with *Platypi*, several nests of this shy and extraordinary animal were discovered.

"The *Platypus* burrows in the banks of rivers, choosing generally a spot where the water is deep and sluggish, and the bank precipitous, and covered with reeds, or overhung by trees. Considerably beneath the level of the stream's surface is the main entrance to a narrow passage, which leads directly into the bank, bearing away from the river, (at a right angle to it,) and gradually rising above its highest watermark. At the distance of some few yards from the river's edge, this passage branches into two others, which, describing each a circular course to the right and left, unite again in the nest itself, which is a roomy excavation, lined with leaves and moss, and situated seldom more than twelve yards from the water, or less than two feet beneath the surface of the earth. Several of their nests were, with considerable labour and difficulty, discovered. No eggs were found in a perfect state, but pieces of a substance resembling egg-shell were picked out of the *debris* of the nest. In the insides of several female *Platypi* which were shot, eggs were found of the size of a large musket ball, and downwards, imperfectly formed, however, i. e. without the hard outer shell, which prevented their preservation."

In another part of his letter, Mr. Maule states, that in one of the nests he was fortunate enough to secure an old female, and two young. The female lived for about two weeks on worms and bread and milk, being abundantly supplied with water, and supported her young, as it was supposed by similar means. She was killed by accident on the fourteenth day after her capture, and on skinning her while yet warm, it was observed that milk oozed through the fur on the stomach, although no teats were visible, on the most minute inspection; but on proceeding with the operation, two teats or canals were discovered, both of which contained milk.

The body of the individual last referred to, (together with several others,) has been preserved in spirits, to be transmitted to Dr. Weatherhead, who stated his intention of examining it anatomically on its arrival, and of laying before the Committee the result of his observations on this interesting subject.

It was remarked that the existence of milk in the situation described by Lieutenant Maule, is fully confirmatory of the correctness of the deductions made by Mr. Owen, from the minute dissection of several individuals, (including one in the Society's collection, presented by Captain Mallard, R. N., Corr. Memb Z. S) that the glands discovered by M. Meckel are really mammary. This opinion, with the anatomical reasons on which it was founded, have been lately laid, by Mr. Owen, before the Royal Society, in a paper which is published in the second part of the Philosophical Transactions for 1832. Mr. Owen's dissections, however, though they established the existence of numerous minute tubes leading from the glands in question through the skin, where it was covered with wool, did not enable him to detect any canals so large as would appear to be indicated in Lieutenant Maule's letter.—ARCANA OF SCIENCE, 1833.

(The Mermaid)

THE MERMAID.—We cannot forbear presenting the reader with a few observations on a creature or being which has employed the speculation, and enlisted the credulity of mankind in various ages, but which we firmly believe to exist only in the eccentric fancy of the poet, or the heated imagination of the superstitious fisherman. In the year 1822, one of these *things*, most ingeniously composed, was exhibited, to the infinite astonishment of the wonder-hunters of the metropolis. The editor of the Literary Gazette observed, when this monster was exhibiting:

"Our opinion is fixed that it is a *composition;* a most ingenious one, we grant, but still nothing beyond the admirably put together members of various animals. The extraordinary skill of the Chinese and Japanese in executing such deceptions is notorious; and we have no doubt but that the Mermaid is a manufacture from the Indian Sea, where it has been pretended it was caught. We are not of those who, because they happen not to have had direct proof of the existence of any extraordinary natural phenomenon, push scepticism to the extreme, and deny its possibility.

The depths of the sea, in all probability, from various chemical and philosophical causes, contain animals unknown to its surface, waters, or if ever, rarely seen by human eye. But when a creature is presented to us, having no other organization but that which is suitable to a medium always open to our observation, it in the first instance excites suspicion that only one individual of the species should be discovered and obtained. When knowledge was more limited, the stories of mermaids seen in distant quarters might be credited by the many, and not entirely disbelieved by the few; but now, when European, and especially British commerce fills every corner of the earth with men of observation and science, the unique becomes the incredible, and we receive with far greater doubt the apparition of such anomalies as the present. It is curious that though medical men seem in general to regard this creature as a possible production of nature, no naturalist of any ability credits it after five minutes observation! This may perhaps be accounted for by their acquaintance with the parts of distinct animals, of which, it appears, the mermaid is composed. The cheeks of the blue-faced ape, the canine teeth, the simia upper body, and the tail of the fish, are all familiar to them in less complex combinations, and they pronounce at once that the whole is an imposture."

The editor of another interesting miscellany adds: "But while we doubt the reality of the disgusting looking mermaid (as it is called) now exhibiting, we are compelled to acknowledge that there is a host of evidence in favour of the existence of such a creature, both in ancient and modern times. Pliny says, that the ambassadors to Augustus from Gaul declared that sea-women were often seen in their neighbourhood Solinus and Aulus Gellius also speak of their existence.

"It is related in the Histoire d'Angleterre, part I, page 403, that in the year 1187, a merman was 'fished up' in the county of Suffolk, and kept by the governor for six months; it was exactly like a man *in every respect*, and wanted nothing but speech. He never could be brought to any understanding of his nature or situation, and at length made his escape, and was seen to plunge into the sea, from whence he returned no more.

"In 1430, in the great tempests which destroyed the dykes in Holland, some women at Edam, in West Freezeland, saw a mermaid who had been driven by the waters into the meadows which were overflowed. They took it and (as it is said) *dressed it in female attire, and taught it to spin.* It fed on cooked meat, but all efforts to teach it to speak proved ineffectual, though Parival says, 'it had some notion of a deity, and *made its reverences very devoutly* when it passed a crucifix.' It was taken to Haerlaem, where it lived some years, but it ever retained an inclination for the water. At its death it was allowed christian burial.

"In 1560, on the coast of Ceylon, some fishermen caught, at one draught of their nets, seven mermen and mermaids. They were dissected, and found made exactly like human beings. For a full account of this last circumstance, see the Histoire de la Compagnie de Jesus, part 2nd. t. 4 No. 276.

"In 1531, a merman, caught in the Baltic, was sent to Sigismond, king of Poland, with whom, says the account he lived three days, and was seen by the whole court; but whether he died or escaped at the end of that period, we cannot say. But in some tracts published by John Gregory, A. M, and chaplain of Christ Church, Oxford, in 1650, this identical merman is described, as 'a huge animal of the human form, but very much resembling a bishop in his pontificals.' A German engraving of this being I have seen, it is extremely curious.

"*Georgius Trapunzantius* declares that he himself saw a mermaid, extremely beautiful, rise many times above water; he adds, that in Epirus, a merman came on shore, and watched near a spring of water, endeavouring to catch young women that came there: he was caught, but could not be made to eat.

"*Maillet*, in his *Teliamede*, speaks of a merman which was seen by the whole of a French ship's crew, off Newfoundland, in 1730, for some hours. The account was signed by all the crew that could write, and was sent to the Comte de Maurepas on the 8th September, 1725."

To bring down the history to the present day:—"Valentyn describes a mermaid he saw in 1714, on his voyage from Batavia to Europe, sitting on the surface of the water, with its back towards them, the body was half above water, and was of a grizzly colour, like the skin of a codfish; it had breasts, and was shaped like a woman above the waist, and from thence downwards went tapering off to a point.

"In the year 1758, a mermaid is said to have been exhibited at the fair of St. Germains, in France. It was about two feet long, very active, sporting about in the vessel of water, in which it was kept, with great agility and seeming delight. It was fed with bread and fish. Its position, when at rest, was always erect. It was a female with ugly negro features. The skin was harsh, the ears very large, and the back parts and tail were covered with scales. M. Gautier, a celebrated French artist, made an exact drawing of it

"Another mermaid, which was exhibited in London in 1775 (for the one now shown is neither the first nor the second with which John Bull has been duped), was said to have been taken in the Gulf of Stanchio, in the Archipelago, by a merchantman trading to Natolia, in August 1774.

"Its face, say the accounts of the day, is like that of a young female; its eyes a fine light blue; its nose small and handsome; its mouth small; its lips thin, and the edges of them round like that of the codfish; its teeth are small, regular and white; its chin well shaped, and its neck full. Its ears are like those of the eel, but placed like those of the human species, and behind them are the gills for respiration, which appear like curls. Some are said to have hair upon their head; but this has only rolls instead of hair, which, at a distance, might be taken for short curls. But its chief ornament is a beautiful membrane or fin rising from the temples, and gradually diminishing till it ends pyramidically, forming a foretop like a lady's headdress. It has no fin on the back, but a bone like that of the human species. Its breasts are fair and full; the arms and hands are well proportioned, but without nails on the fingers; the belly is round and swelling, but there is no navel. From the waist downwards the body is in all respects like the codfish; it has three sets of fins one above another below the waist, which enable it to swim erect on the sea.

"In the year 1794, a mermaid, as it was called, was shown at No. 7, Broad-court, Bow-street, Covent-garden; it was said to have been taken in the North Seas by Captain Fortier. This nymph of the sea, a woman from the head down to the lower part of the waist, and a fish from thence downwards, was three feet long, having ears, gills, breasts, fins, shoulders, arms, hands, fingers, and a contiguous scale covering the fish part.

The existence of this animal is firmly believed in the northern parts of Scotland, and in the year 1797, a schoolmaster of Thurso affirmed, that he had seen one, apparently in the act of combing its hair with its fingers. The portion of the animal which he saw was so near a resemblance to the form of a woman, that but for the impossibility of a female so long supporting herself in the waves, he should have presumed it to have been one. Twelve years afterwards, several persons observed near the same place a like appearance.

"The next publication in which we find any account relative to the mermaid worthy of notice, is Dr. Chisholm's Essay on the Malignant Fever in the West Indies, published in 1801. The Doctor speaks of it as follows:—'I probably hazard the implication of credulity by the following note:—In the year 1797, happening to be at Governor Van Battenburgh's plantation, in Berbice, the conversation turned on a singular animal which had been repeatedly seen in Berbice river, and some smaller rivers. This animal is the famous mermaid, hitherto considered as a mere creature of the imagination. It is called by the Indians *méné mamma*, or mother of the waters. The description given of it by the governor is as follows:—The upper portion resembles the human figure; the head smaller in proportion, sometimes bare, but oftener covered with a copious quantity of long black hair. The shoulders are broad, and the breasts large and well formed. The lower portion resembles the tail portion of a fish, is of immense dimension, the tail forked, and not unlike that of the dolphin, as it is usually represented. The colour of the skin is either black or tawny. The animal is held in veneration and dread by the Indians, who imagine that the killing of it would be attended with the most calamitous consequences. It is from this circumstance that none of these animals have been shot, and consequently, not examined but at a distance. They have been generally observed in a sitting posture in the water, none of the lower extremity being discovered until they are disturbed, when, by plunging, the tail appears, and agitates the water to a considerable distance round. They have been always seen employed in smoothing their hair, or stroking their faces and breasts with their hands, or something resembling hands. In this posture, and thus employed, they have been frequently taken for Indian women bathing.' Mr. Van Battenburgh's account was much corroborated by that of some gentlemen settled in Mahaycony and Abary.

"At Sandside, in the parish of Reay, in the county of Caithness, there was seen, on the 12th of January, 1809, an animal supposed to be the mermaid. The head and the chest, being all that was visible, is said to have exactly resembled those of a full-grown young woman. The breasts were perfectly formed; the arms longer than in the human body, and the eyes somewhat smaller. When the waves dashed the hair, which was of a sea-green shade, over the face, the hands were immediately employed to replace it. The skin was of a pink colour. Though observed by several persons within the distance of twenty yards, for about an hour and a half, it discovered no symptoms of alarm.

"In 1811, a young man, named John M'Isaac, of Corphine, in Kintyre, in Scotland, made oath, on examination, at Campbletown, before the sheriff-substitute of Kintyre, that he saw, on the afternoon of the 13th of October, in that year, on a black rock on the sea-coast, an animal, of the particulars of which he gives a long and curious detail. He states that the upper half of it was white, and of the shape of a human body; the other half, towards the tail, of a brindled or reddish grey colour, apparently covered with scales; but the extremity of the tail itself was of a greenish red shining colour; that the head was covered with long hair; at times it would put back the hair on both sides of its head: it would also spread its tail like a fan; and, while so extended, the tail continued in tremulous motion, and when drawn together again, it remained motionless, and appeared to the deponent to be about twelve or fourteen inches broad; that the hair was very long and light brown; that the animal was between four and five feet long; that it had a head, hair, arms, and body, down to the middle, like a human being; that the arms were short in proportion to the body, which appeared to be about the thickness of that of a young lad, and tapering gradually to the point of the tail; that when stroking its head, as above mentioned, the fingers were kept close together, so that he cannot say whether they were webbed or not; that he saw it for near two hours, the rock on which it lay being dry, that, after the sea had so far retired as to leave the rock dry to the height of five feet above the water, it tumbled clumsily into the sea; a minute after he observed the animal above water, and then he saw every feature of its face, having all the appearance of a human being, with very hollow eyes. The cheeks were of the same colour with the rest of the face; the neck seemed short; and it was constantly, with both hands stroking and washing its breast, which was half immersed in the water; he, therefore, cannot say whether its bosom was formed like a woman's or not. He saw no other fins or feet upon it but as described. It continued above water for a few minutes, and then disappeared. The minister of Campbletown, and the Chamberlain of Mull, attest his examination, and declare that they know no reason why his veracity should be questioned

"In 1812, Mr. Toupin, of Exmouth, published the following account of his having seen a mermaid: 'The day, (August 11,)' says he, 'being very fine, I joined a party of ladies and gentlemen in a sailing excursion. When we had got about a mile to the south-east of Exmouth-bar, our attention was suddenly arrested by a very singular noise, by no means unpleasant to the ear, but of which it is impossible to give a correct idea by mere description. It was not, however, unaptly compared by one of our ladies to the wild melodies of the Æolian harp,* combined with a noise similar to that made by a stream of water falling gently on the leaves of a tree. In the mean time we observed something about one hundred yards from us, to windward. We all imagined it to be some human being, though at the same time we were at a loss to account for this, at such a distance from the shore, and no other boat near. We hailed, but received no reply, and we made toward this creature as soon as possible, when, to the great astonishment of us all, it eluded our pursuit by plunging under water. In a few minutes it rose again, nearly in the same place; and by that time we had got sufficiently near for one of the boatmen to throw into the water a piece of boiled fish, which he had in his locker. This seemed to alarm the animal, though it soon recovered from its fears, for we presently observed it to lay hold of the fish, which it ate with apparent relish. Several other pieces were thrown out, by which the creature was induced to keep at a short distance from our boat, and afforded us the opportunity of observing it with attention, and found to our astonishment that it was no other than a mermaid. As the sea was calm, and in a great degree transparent, every part of the animal's body became in turn visible. The head, from the crown to the chin, forms rather a long oval, and the face seems to resemble that of the seal, though, at the same time, it is far more agreeable, possessing a peculiar softness, which renders the whole set of features very interesting. The upper and back part of the head appeared to be furnished with something like hair, and the forepart of the body with something like down, between a very light fawn and a very pale pink colour, which, at a distance, had the appearance of flesh, and may have given rise to the idea that the body of the mermaid is, externally, like that of the human being. This creature has two arms, each of which terminates into a hand with four fingers, connected to each other by means of a very thin elastic membrane. The animal used its arms with great agility, and its motions in general were very graceful. From the waist it gradually tapered so as to form a tail, which had the appearance of being covered with strong broad polished scales, which occasionally reflected the rays of the sun in a very beautiful manner; and from the back and upper part of the neck, down to the loins, the body also appeared covered with short round broad *feathers*, of the colour of the down on the fore part of the body. The whole length of the animal, from the crown of the head to the extremity of the tail was supposed to be about five feet, or five feet and a half. In about ten minutes from the time we approached, the animal gave two or three plunges, in quick succession, as if it were at play. After this, it gave a sudden spring, and swam away from us very rapidly, and in a few seconds we lost sight of it.'

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* Here we have the fiction of the Syrens realised, which none of our Argus-eyed mermaid-hunters had hitherto done. The Syrens, in fabulous history, were certain celebrated songstresses, who were ranked among the demi-gods of antiquity. Hyginus places their birth among the consequences of the rape of Proserpine. Others make them the daughters of the river Achelous and one of the Muses. The number of the Syrens was three, and their names were *Parthenope, Lygea*, and *Leucosia*. Some make them half women and half fish; others, half women and half birds. There are antique representations of them still subsisting under both these forms. Pausanias tells us that the Syrens, by the persuasion of Juno, challenged the Muses to a trial of skill in singing; and these, having vanquished them, plucked the golden feathers from the wings of the Syrens, and formed them into crowns, with which they adorned their own heads The Argonauts are said to have been diverted from the enchantment of their songs by the superior strains of Orpheus. Ulysses, however, had great difficulty in securing himself from seduction.

"It must be in the recollection of most persons, that in the autumn of 1819, a creature appeared on the coast of Ireland, about the size of a child of ten years of age, with a bosom as prominent as a girl of sixteen, having long dark hair, and full dark eyes. We shall not transcribe the account, as it will doubtless be well remembered; but it may be right to add, for the satisfaction of those who have not seen it, that a spectator endeavoured to shoot it, but on the report of the musket, it plunged into the sea with a loud scream.

"Since this time we heard nothing of mermaids, until an American ship, and a Bostoman too, Captain Eades, established this wonder of the deep, which is now the wonder of the good people of London, at the Cape of Good Hope. It is said to have been caught on the north coast of China, by a fisherman, who sold it for a trifle, when Captain Eades bought it for 5,000 Spanish dollars. At least so the first account from the Cape stated; but the present possessor of this *interesting* creature, who certainly believed it to be a real mermaid, only estimates the whole cost at the Cape and bringing home at 1,000*l.*; so that it is probable Jonathan did not give half the money stated.

Without offering any remarks as to the existence or non-existence of the mermaid, we may observe that the question is as far from solution as ever, since it seems to be universally acknowledged by all persons capable of judging, that the mermaid now exhibiting is nothing but the head and bust of a baboon joined to the tail of a fish. This circumstance, however, does not appear to affect the exhibition, which continues as crowded as ever."—MIRROR, VOL. I., 1822.

"The English are particularized for their partiality to strange sights," says Strutt; uncommon beasts, birds, or fishes, are sure to attract their notice, and especially such of them as are of a monstrous kind: and this propensity of our countrymen is neatly satirized by Shakspeare, in the Tempest, where Stephano, seeing Caliban lying upon the stage, and being uncertain whether he was a fish, a beast, or one of the inhabitants of the island, speaks in the following manner: "Were I in England now, as once I was, and had this fish painted, not a holiday fool there but would give me a piece of silver. There would the monster make a man: any strange beast there makes a man. When they will not give a doit to relieve a lame beggar, they will lay out ten to see a dead Italian." Indeed we may observe, that a cow with two heads, a pig with six legs, or any other unnatural production, with proper management, are pretty certain fortunes to the possessors in this country.—ED.

CHAP. XX.

ANIMALS OF THE MONKEY KIND.*

QUADRUPEDS may be considered as a numerous group, terminated on every side by some that but in part deserve the name. On one quarter we see a tribe covered with quills, or furnished with wings, that lift them among the inhabitants of air; on another, we behold a diversity clothed with scales and shells, to rank with insects; and still, on a third, we see them descending into the waters, to live among the mute tenants of that element. We now come to a numerous tribe, that, leaving the brute creation, seem to make approaches even to humanity; that bear an awkward resemblance of the human form, and discover some faint efforts at intellectual sagacity.†

Animals of the monkey class are furnished with hands instead of paws; their ears, eyes, eyelids, lips, and breasts, are like those of mankind; their internal conformation also bears some distant likeness; and the whole offers a picture that may well mortify the pride of such as make their persons alone the principal object of their admiration.

These approaches, however, are gradual; and some bear the marks of this our boasted form, more strongly than others.

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* The animals of this very extensive family are distinguished by their having four front teeth in each jaw, all placed close together, as in the human mouth; the canine teeth are longer than the rest, and a little distant from the grinders; the grinders are obtuse.

† MAN.—There are few departments of human knowledge that have been more disfigured by fable, imposture, misconception, and exaggeration than natural history in general. Few portions of natural history have suffered more from the same causes than that which relates to the quadrumanous species of the animal world; and the first subdivision of those animals, namely, that of the apes, has proved in a more especial manner a fertile source of falsehood and misrepresentation, of impudent or ignorant distortion of facts, and of ridiculous and contemptible absurdity of deduction.

Man has not merely been placed by his Maker at the head of the countless organized beings which occupy this nether world, but he has also been disjointed, as it were, and severed from them all. His natural superiority is strongly marked, even in the earliest stages of moral advancement, and when his unexcited faculties lie almost dormant within him. Attitude, physiognomy, and language proclaim the rudest savage that traverses the wild, to be lord of the prone and mute creation that surrounds him. But when, by the judicious cultivation of his moral and intellectual faculties, the diviner part of man's nature becomes fully developed, we then see clearly and palpably that the gulf which separates him from other creatures is impassable. It matters not how nearly they may approximate to his outward form or his physical peculiarities, his mental powers set him at an immeasurable height above them all. His supremacy is no usurpation of pride; it is the gift of Heaven, and has been universally recognised in all ages and among all nations. The most untaught have yet learned to know and to respect the dignity of their nature—

"To venerate themselves as men."—GRIFFITH.

INTELLIGENCE OF THIS RACE.—The degrees of their so much vaunted intelligence, which is in general very limited, and rarely capable of being made subservient to the purposes of man, vary almost as much as the ever-changing outline of their form. From the grave and reflective oran-outang, whose docility and powers of imitation in his young state have been the theme of so much ridiculous exaggeration and sophistical argument, to the stupid and savage baboon, whose gross brutality is scarcely relieved by a single spark of intelligence, the gradations are regular and easy. A remarkable circumstance connected with the developement of this faculty, or perhaps we should rather say, with its gradual extinction, consists in the fact that it is only in young animals which have not yet attained their full growth that it is capable of being brought into play; the older individuals, even of the most tractable races, entirely losing the gaiety, and with it the docility of their youth, and becoming at length as stupid and as savage as the most barbarous of the tribe.

THE ORAN-OUTANG, OR WILD MAN OF THE WOODS.—The foremost of the Ape kind is the Oran Outang, or Wild Man of the Woods. The oran-outang, which, of all other animals, most nearly approaches to the human race, is seen of different sizes, from three to seven feet high. In general, however, its stature is less than that of a man; but its strength and agility much greater. Travellers who have seen various kinds of these animals in their native solitudes, give us surprising relations of their force, their swiftness, their address, and their ferocity. Naturalists who have observed their form and manners at home, have been as much struck with their patient, pliant, imitative dispositions; with their appearance and conformation so nearly human. Of the smallest sort of these animals, we have had several, at different times, brought into this county, all nearly alike; but that observed by Dr Tyson, is the best known, having been described with the greatest exactness.*

(The Oran Outang.)

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* The Great Oran-Outang.—Naturalists are now inclined to suspect that what has hitherto been described in Europe as the Oran-Outang, is, in fact, a young *Pongo*—an ape of great size and strength.

"A party having landed on the north coast of Sumatra, from the Mary Anne Sophia, Captain Cornfoot, for the purpose of watering, fell in with an animal of the monkey species of a most gigantic size. It was upwards of seven feet in height; and, after receiving seven shots, was killed. After the fifth shot, it climbed a tree, and reclined against its boughs, to all appearance in great pain, and vomited a considerable quantity of blood. Its lower jaw, and the skin of the back and arms, which were brought round to Calcutta, I have seen. The lower jaw is immense; and the skin is so large, that, although cut off from the wrists, each arm is now considerably longer than mine, and I am a man not a quarter of an inch under six feet.

Dr. Abel adds the following additional information, obtained through direct oral communication with one of the parties present at the slaughter:—"This formidable animal was more than a head taller than the tallest man on board, even in an ordinary standing position, and it measured eight feet in height when suspended for the purpose of being skinned. The form and arrangement of its beard were beautiful; there was a great deal of human expression in its countenance, and its piteous actions when wounded, and great tenacity of life, rendered the scene affecting and tragical. On the spot where he was killed, there were five or six tall trees which greatly prolonged the combat; for so great was his strength and agility in bounding from branch to branch, that his pursuers were unable to take a determinate aim, until they had felled all the trees but one. Even then he did not yield himself to his antagonists till he had received five balls, and been moreover thrust through with a spear. One of the first balls appears to have penetrated his lungs, for he was observed immediately to sling himself by his feet from a branch with his head downwards, so as to allow the blood to flow from his mouth. On receiving a wound, he always put his hand over the injured part, and distressed his pursuers by the human-like agony of his expressions. When on the ground, after being exhausted by his many wounds, he lay as if dead, with his head resting on his folded arms It was at this moment that an officer attempted to give him the *coup-de-grace* by pushing a spear through his body, but he immediately jumped on his feet, wrested the weapon from his antagonist, and shivered it to pieces. This was his last wound, and his last great exertion; yet he lived some time afterwards, and, drank, it is stated, great quantities of water."—Asiatic Researches.

The animal which was described by that learned physician, was brought from Angola in Africa, where it had been taken in the internal parts of the country, in company with a female of the same kind, that died by the way. The body was covered with hair, which was of a coal black colour, more resembling human hair than that of brutes. It bore a still stronger similitude in its different lengths; for in those places where it is longest on the human species, it was also longest in this; as on the head, the upper lip, the chin, and the pubes. The face was like that of a man, the forehead larger, and the head round. The upper and lower jaws were not so prominent as in monkeys; but flat, like those of a man. The ears were like those of a man in most respects; and the teeth had more resemblance to the human, than those of any other creature. The bending of the arms and legs were just the same as in a man: and, in short, the animal, at first view, presented a figure entirely human.

In order to discover its differences, it was necessary to make a closer survey; and then the imperfections of its form began to appear. The first obvious difference was in the flatness of the nose; the next in the lowness of the forehead, and the wanting the prominence of the chin. The ears were proportionably too large; the eyes too close to each other; and the interval between the nose and mouth too great. The body and limbs differed, in the thighs being too short, and the arms too long; in the thumb being too little, and the palm of the hand too narrow. The feet also were rather more like hands than feet; and the animal, if we may judge from the figure, bent too much upon its haunches.

When this creature was examined anatomically, a surprising similitude was seen to prevail in its internal conformation. It differed from man in the number of its ribs, having thirteen; whereas, in man, there are but twelve. The vertebræ of the neck also were shorter, the bones of the pelvis narrower, the orbits of the eyes were deeper, the kidneys were rounder, the urinary and gall bladders were longer and smaller; and the ureters of a different figure. Such were the principal distinctions between the internal parts of this animal and those of man; in almost every thing else they were entirely and exactly the same, and discovered an astonishing congruity. Indeed, many parts were so much alike in conformation, that it might have excited wonder how they were productive of such few advantages. The tongue, and all the organs of the voice, were the same, and yet the animal was dumb; the brain was formed in the same manner with that of man, and yet the creature wanted reason: an evident proof (as Buffon finely observes) that no disposition of matter will give mind; and that the body, how nicely soever formed, is formed in vain, when there is not infused a soul to direct its operations.

Having thus taken a comparative view of this creature with man, what follows may be necessary to complete the general description. This animal was very hairy all behind, from the head downwards; and the hair so thick, that it covered the skin almost from being seen: but in all parts before, the hair was much thinner, the skin every where appeared, and in some places it was almost bare. When it went on all fours, as it was sometimes seen to do, it appeared all hairy; when it went erect, it appeared before less hairy, and more like a man. Its hair, which in this particular animal was black, much more resembled that of men than the fur of brutes; for, in the latter, besides their long hair, there is usually a finer and shorter intermixed; but in the ouran-outang it was all of a kind; only about the pubes the hair was greyish, seemed longer, and somewhat different; as also on the upper lip and chin, where it was greyish, like the hair of a beard. The face, hands, and soles of the feet, were without hair; and so was most part of the forehead; but down the sides of the face the hair was thick, it being there about an inch and a half long, which exceeded that on any other part of the body. In the palms of its hands were remarkable those lines which are usually taken notice of in palmistry; and at the tips of the fingers, those spiral lines observed in man. The palms of the hands were as long as the soles of the feet; and the toes upon these were as long as the fingers: the middle toe was the longest of all, and the whole foot differed from the human

The hinder feet being thus formed as hands, the animal often used them as such; and, on the contrary, now and then made use of its hands instead of feet. The breasts appeared small and shrivelled, but exactly like those of a man: the navel also appeared very fair, and in exact disposition, being neither harder nor more prominent than what is usually seen in children. Such is the description of this extraordinary creature; to which little has been added by succeeding observers, except that the colour of the hair is often found to vary · in that described by Edwards it was of a reddish brown.

From a picture so like that of the human species, we are naturally led to expect a corresponding mind; and it is certain that such of these animals as have been shown in Europe, have discovered a degree of imitation beyond what any quadruped can arrive at.(g)

The little animals we have been describing, which are seldom found above four feet high, seem to partake of the nature of dwarfs among the human species, being gentle, assiduous and playful, rather fitted to amuse than terrify. But the gigantic races of the ouran-outang, seen and described by travellers, are truly formidable: and in the gloomy forests, where they are only found, seem to hold undisputed dominion. Many of these are as tall or taller than a man; active, strong, and intrepid, cunning, lascivious, and cruel. This redoubtable rival of mankind is found in many parts of Africa, in the East Indies, in Madagascar, and in Borneo.(g) In the last of these places, the people of quality course him as we do the stag; and this sort of hunting is one of the favourite amusements of the king himself.* This creature is extremely swift of foot, endowed with extraordinary strength, and runs with prodigious celerity. His skin is all hairy, his eyes sunk in his head, his countenance stern, his face tanned, and all his lineaments, though exactly human, harsh and blackened by the sun. In Africa this creature is even still more formidable. Battel calls him the Pongo, and assures us that in all his proportions he resembles a man, except that he is much larger, even to a gigantic state. His face resembles that of a man, the eyes deep sunk in the head, the hair on each side extremely long, the visage naked and without hair, as also the ears and the hands. The body is lightly covered, and scarcely differing from that of a man, except that there are no calves to the legs. Still, however, the animal is seen to walk upon his hinder legs, and in an erect posture. He sleeps under trees, and builds himself a hut, which serves to protect him against the sun and the rains of the tropical climates, of which he is a native. He lives only upon fruits, and is no way carnivorous. He cannot speak, although furnished with a greater instinct than any other animal of the brute creation. When the negroes make a fire in the woods, this animal comes near and warms himself by the blaze. However, he has not skill enough to keep the flame alive by feeding it with fuel. They go together in companies, and if they happen to meet one of the human species, remote from succour, they show him no mercy. They even attack the elephant, which they beat with their clubs, and oblige to leave that part of the forest which they claim as their own. It is impossible to take any of these dreadful creatures alive, for they are so strong that ten men would not be a match for but one of them. None of this kind, therefore, are taken except when very young, and these but rarely, when the female happens to leave them behind, for in general they keep clung to the breast, and adhere both with legs and arms From the same traveller we learn, that when one of these animals dies, the rest cover the body with a quantity of leaves and branches. They sometimes also show mercy to the human kind. A negro boy, that was taken by one of these, and carried into the woods, continued there a whole year, without receiving any injury.(*g*) From another traveller we learn, that these animals often attempt to surprise the female negroes as they go into the woods, and frequently keep them against their wills for the pleasure of their company, feeding them very plentifully all the time. He assures us that he knew a woman of Loango that had lived among these animals for three years.*

(g) Habits of the Oran-Outang.—Buffon gives an interesting account of one:—"I have seen it," says he, "give its hand to show the company to the door: I have seen it sit at table, unfold its napkin, wipe its lips, make use of the spoon and the fork to carry the victuals to its mouth, pour out its drink into a glass, touch glasses when invited, take a cup and saucer and lay them on the table, put in sugar, pour out its tea, leave it to cool before drinking; and all this without any other instigation than the signs or the command of its master, and often of its own accord. It was gentle and inoffensive; it even approached strangers with respect, and came rather to receive caresses than to offer injuries. It was particularly fond of sugared comfits, which every body was ready to give it; and, as it had a defluxion upon the breast, so much sugar contributed to increase the disorder and shorten its life. It continued at Paris but one summer, and died in London. It ate indiscriminately of all things, but it preferred dry and ripe fruits to all other aliments. It would drink wine, but in small quantities, and gladly left it for milk, tea, or any other sweet liquor.

"Such these animals appeared when brought into Europe. However, many of their extraordinary habits were probably the result of education, and we are not told how long the instructions they received for this purpose were continued. But we learn from another account that they take but a very short time to come to a great degree of imitative perfection. Mr. L. Brosse bought two young ones, that were but a year old, from a negro; and these at that early age discovered an astonishing power of imitation. They even then sat at the table like men, ate of every thing without distinction, made use of their knife, spoon, and fork, both to eat their meat and help themselves. They drank wine and other liquors. When carried on shipboard, they had signs for the cabin boys expressive of their wants; and whenever these neglected attending upon them as they desired, they instantly flew into a passion, seized them by the arm, bit them, and kept them down. The male was sea-sick, and required attendance like a human creature; he was even twice bled in the arm; and every time afterwards when he found himself out of order, he showed his arm, as desirous of being relieved by bleeding."

* Recent Capture of this Animal.—A female oran-outang has lately been captured by Captain Hull on the coast of Sumatra. On his arrival at Truman, where he was kindly received, he heard various accounts from the natives of the animal he was in search of, called by them Orang Mawah, Mawi, or Mawy. These animals, they said, resided in the deepest part of a forest, distant from Truman about five or six days' journey, and they appeared very averse to undertake any expedition in search of them, stating that these beings would assuredly attack any small party, especially if a woman should be with them, whom they would endeavour to carry off. They were unwilling also to destroy these animals from a superstitious belief that they are animated by the souls of their ancestors, and that they

(g) Le Compte's History of China

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hold dominion over the great forest of Sumatra. After some days' debate, however, and hearing that a Mawah had been seen in the forest, the young man collected a party of twenty persons, armed with muskets, spears, and bamboos, and having marched in an easterly direction for above thirty miles, fell in with the object of his search. The orang was sitting on the summit of one of the highest trees with a young one in its arms. The first fire of the party struck off the great toe of the old orang, who uttered a hideous cry, and immediately lifted up her young one as high as her long arms would reach, and let it go amongst the topmost branches, which appeared too weak to sustain herself. During the time the party were cautiously approaching her to obtain another shot, the poor animal made no attempt to escape, but kept a steady watch on their movements, uttering at the same time singular sounds; and glancing her eye occasionally towards her young one, seemed to hasten its escape by waving her hand. The second volley brought her to the ground, a ball having penetrated her breast, but the young one escaped. She measured four feet eleven inches in length, and two feet across the shoulders, and was covered with red hair. It is probable from the spot where this animal was found being so near to Truman, that she was the mate of one destroyed by the party from the brig. Her remains, consisting of the skin and all the bones, were transmitted home by Captain Hull to Sir Stamford Raffles, at Bencoolen.—Arcana of Science, 1828.

* Humorous Incident.—Pere Caubasson brought up an oran-outang, which became so fond of him that wherever he went it always seemed desirous of accompanying him: whenever, therefore, he had to perform the service of his church, he was under the necessity of shutting it up in a room. Once, however, the animal escaped, and followed the father to the church, where, silently mounting the sounding board above the pulpit, he lay perfectly still till the sermon commenced. He then crept to the edge, and overlooking the preacher, imitated all his gestures in so grotesque a manner, that the whole congregation

(*g*) Le Brosse, as quoted by Buffon, vol. xxviii. p. 70.

From this description of the ouran-outang, we perceive at what a distance the first animal of the brute creation is placed from the very lowest of the human species. Even in countries peopled with savages, this creature is considered as a beast; and in those very places where we might suppose the smallest difference between them and mankind, the inhabitants hold it in the greatest contempt and detestation. In Borneo, where this animal has been said to come to its greatest perfection, the natives hunt it in the same manner as they pursue the elephant or the lion, while its resemblance to the human form procures it neither pity nor protection. The gradations of nature in the other parts of nature are minute and insensible; in the passage from quadrupeds to fishes we can scarcely tell where the quadruped ends and the fish begins; in the descent from beasts to insects we can hardly distinguish the steps of the progression; but in the ascent from brutes to man the line is strongly drawn, well marked, and unpassable. It is in vain that the ouran-outang resembles man in form, or imitates many of his actions; he still continues a wretched, helpless creature, pent up in the most gloomy part of the forest, and with regard to the provision for his own happiness, inferior even to the elephant or the beaver in sagacity. To us, indeed, this animal seems much wiser than it really is. As we have long been used to measure the sagacity of all actions by their similitude to our own, and not their fitness to the animal's way of living, we are pleased with the imitations of the ape, even though we know they are far from contributing to the convenience of its situation. An ape, or a quadruped, when under the trammels of human education, may be an admirable object for human curiosity, but is very little advanced by all its learning in the road to its own felicity. On the contrary, I have never seen any of these long instructed animals that did not, by their melancholy air, appear sensible of the wretchedness of their situation. Its marks of seeming sagacity were merely relative to us and not to the animal; and all its boasted wisdom was merely of our own making.*

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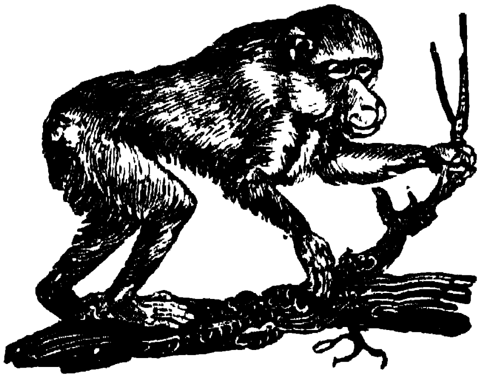
were unavoidably urged to laugh. The father, surprised and confounded at this ill-timed levity, severely rebuked his audience for their inattention. The reproof failed in its effect; the congregation still laughed, and the preacher, in the warmth of his zeal, redoubled his vociferations and his actions: these the ape imitated so exactly, that the congregation could no longer restrain themselves, but burst out into a loud and continued laughter. A friend of the preacher at length stepped up to him, and pointed out the cause of this improper conduct, and the servants of the church took it away.

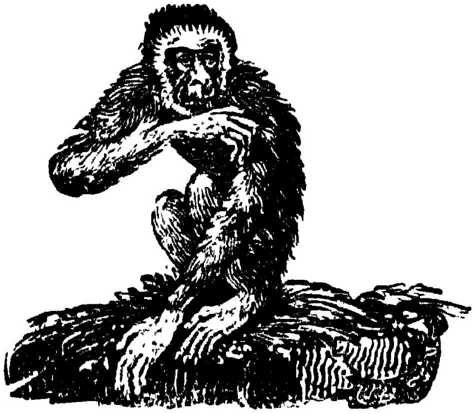
* Sagacity of the Oran-Outang —Mr. Grant in a paper on the habits and structure of a male and female oran-outang observes—Oran-outangs, it has been remarked, have exhibited no greater degree of intelligence than a dog. This, generally speaking, is, I believe, a correct enough observation, but then let us bear in mind the comparative advantages, in relation to his connexion with human society, that the dog possesses over the oran-outang. Companionship with man is to the dog a state of nature and gratification; he is "to the manner born." Not so the poor oran-outang, left, perhaps, when an infant or very young, and unable to provide for itself at some spot, while its mother wanders in another direction, with the intention of returning by and by to lead him *home*. A Sumatran or Bornese forester passing that way swoops him off; and the little creature that had been accustomed to active gambols in the wild wood, (to say nothing of change of diet, and climate, and water,) is henceforth transferred to, and confined to a small inclosure, where its movements are circumscribed, where he is perhaps chained; and never like the dog, solaced with the society of its kind; where, in short, his whole system and habits must undergo a change consequent on slavery, and where its faculties have not their fair field for developement. How it is to be expected, under such circumstances, that an oran-outang child, (for all the orans to descriptions of which I have had access, were supposed to be very young,) should be *more* intelligent than the most intelligent of all the inferior animals, the full-grown dog, in the prime of its faculties and strength, naturalized to a state of connexion with human society, and unhappy save under such circumstances? The oran-outang, however, without being taught, will do what a dog, I suspect, cannot be taught to do, and untaught, cannot think of doing: he will untwist or unravel his chain or cord. If the dog is chained, and the chain becomes in any way jammed between things lying about, or twisted upon itself, the animal drags hard at it, *away* from the point of entanglement, perhaps increasing the evil,—becomes alarmed—cries out, and never thinks of slackening the chain, and returning back to see what the cause of the

The animal next to these, and to be placed in the same class, is the Ape, properly so called, or the Pithekos of the ancients. This is much less than the former, being not above a foot and a half high, but walks erect, is without a tail, and is easily tamed.



(The Barbary Ape.)

Of this kind also is the Gibbon, so called by Buffon, or the Long Armed Ape, which is a very extraordinary and remarkable creature. It is of different sizes, being from four feet to two feet high. It walks erect, is without a tail, has a face resembling that of a man, with a circle of bushy hair all round the visage; its eyes are large, and sunk in its head; its face tanned, and its ears exactly proportioned. But that in which it chiefly differs from all others of the monkey tribe is the extraordinary length of its arms, which, when the animal stands erect, are long enough to reach the ground; so that it can walk upon all fours, and yet keep its erect posture at the same time. This animal, next to the oran-outang and the ape, most nearly resembles mankind, not only in form, but in gentle manners and tractable disposition. It is a native of the East Indies, and particularly found along the coasts of Coromandel.



(The Long armed Ape.)

The last of the ape kind is the Cynocephalus, or the Magot of Buffon.* This

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inconvenience is. Not so the oran-outang; the moment such an accident occurs, he deliberately sets about putting matters to rights. He does not drag away from the point of resistance, does not insist on running forcibly counter, but instantly slackens his chain, as a human being would do under the like circumstances, and goes back to *see* what occasions the obstruction. If the chain has got entangled with a box or any other article of furniture, he disengages it; if it has become twisted, he considers the matter, and untwists it. It may perhaps be said in reply, that the possession of hands gives the oran advantages that the dog has not, in the instance referred to, and so undoubtedly it does; but it is not natural for an oran to be chained, and the whole process evinces that he thinks or reflects upon the predicament he has got into, which the dog apparently does not, but loses his presence of mind. I have a monkey chained in my compound, (*Simia entellus*,) but when his chain becomes entangled or twisted, he does not get himself out of the scrape like the oran-outang, but, like the dog, makes matters worse by dragging impetuously.—ARCANA OF SCIENCE, 1832.

* THE UNGKA APE OF SUMATRA.—Mr. George Bennett, F.L.S. &c. has communicated to the *Magazine of Natural History*, an interesting account of the habits and structure of this curious animal, of which the subjoined is an abstract.

During a visit to the Island of Singapore, on the 13th of November, 1830, a male specimen of this interesting animal was presented to me: it had been recently brought by a Malay lad from the Menangkabau country, in the interior of Sumatra. The Malays at Singapore called this animal the Ungka; by Sir Stamford Raffles it has been stated as being called the Siamang among the natives; and the Ungka ape is described by F. Cuvier as the Onko, in his splendid work on the Mammalia, plates v. and vi. On making inquiry among the Malays at Singapore, they denied this animal being the Siamang, at the same time stating that the Siamang resembled it in form, but differed in having the eyebrows and hair around the face of a white colour.

The Simia syndactyla is described and figured in Dr. Horsfield's *Zoology of Java*; but the engraving does not give a correct idea animal wants a tail, like the former, although there is a small protuberance at that part, which yet is rather formed by the skin than the bone. It differs also in having a large callous red rump. The face is prominent, and approaches more to that of quadrupeds than of man. The body is covered with a brownish hair, and yellow on the belly. It is about three feet and a half, or four feet

of the animal. The following sketch is taken from a drawing made by Charlas Landseer, Esq., from the original, which is now deposited in the British Museum. The measurement of the animal was as follows:—From the os calcis to the vertex of the head, 2 ft. 4 in.; span of the arms, 4 ft.; length of the arm, from the axilla to the termination of the fore finger, 1 ft. 10½ in.; length of the leg, from the groin to the os calcis, 11 in.; length from the xiphoid or ensiform cartilage to the crest of the pubis, 7½ in.

The teeth are twelve in each jaw; four incisors, two canine, and six molares: in the upper jaw the canine were placed widely apart from the last incisor, giving an appearance as if a tooth was deficient: this did not occur in the lower jaw. The teeth of the animal were in very bad condition. The colour of the animal is entirely black, being covered with stiff hair of a beautiful jet black over the whole body; the face has no hair, except on the sides as whiskers, and the hair stands forward from the forehead over the eyes; there is little beard. The skin of the face is black; the arms are very long, the radius and ulna being of greater length than the os humeri; the hair on the arm runs in one direction, viz. downwards, that on the forearm upwards; the hands are long and narrow, fingers long and tapering; thumb short, not reaching farther than the first joint of the fore finger; the palms of the hands and soles of the feet are bare and black; the legs are short in proportion to the arms and body; the feet are long, prehensile, and when the animal is in a sitting posture, are turned inwards, and the toes are bent. The first and second toes are united, (except at the last joint,) by a membrane, from which circumstance he has derived his specific name. He invariably walks in the erect posture when on a level surface; and then the arms either hang down, enabling him sometimes to assist himself with his knuckles; or, what is more usual, he keeps his arms uplifted in an erect position, with the hands pendent, ready to seize a rope and climb up on the approach of any danger, or on the obtrusion of strangers. He walks rather quick in the erect posture, but with a waddling gait, and is soon run down if, whilst pursued, he has no opportunity of escaping by climbing. On the foot are five toes, the great toe being placed like the thumb of the hand; the form of the foot is somewhat similar to that of the hand, having an equal prehensile power; the great toe has a capability of much extension outwards, which enlarges the surface of the foot when the animal walks; the toes are short, the great toe is the longest. The eyes of the animal are close together, with the irides of a hazel colour; the upper eyelids have lashes, the lower have none: the nose is confluent with the face, except at the nostrils, which are a little elevated; nostrils on each side, and the nose united to the upper lip: the mouth large: ears small, and resembling the human, but without the pendent lobe. He has nails on the fingers and toes; he has two hard tubercles on the tuberosities of the ischium, but is destitute of a tail, or even the rudiments of one.

His food is various: he prefers vegetable diet, as rice, plantains, &c., and was ravenously fond of carrots, of which we had some quantity preserved on board. He would drink tea, coffee, and chocolate, but neither wine nor spirits: of animal food he prefers fowl to any other; but a lizard having been caught on board, and placed before him, he took it immediately in his paw, and greedily devoured it.

He is not able to take up small objects with facility, on account of the disproportion of the size of the thumb to the fingers. The metacarpal bone of the thumb has the mobility of a first joint; the form of both the feet and hands gives a great prehensile power, fitted for the woods where it must be almost impossible to capture an adult animal alive.

Under the throat is a large black pouch, a continuation of the common integument, and very thinly covered with hair: this pouch is not very visible when undistended: it is a thick integument, of a blackish colour and corrugated appearance. It extends from the under part of the chin to the throat, and is attached as low down as the upper part of the sternum, and is also attached above to the symphysis of the lower jaw: its use is not well known, but it is not improbable that it is an appendage to the organ of voice. Sometimes, when irritated, I have observed him inflate the pouch, uttering at the same time a hollow barking noise;* for the production of which, the rushing of the air into the sac was an adjuvant. The inflation of the pouch was not, however, confined to anger; for, when pleased he would purse the mouth, drive the air with an audible noise

* When the barking noise was made, the lips were pursed out, and the air driven into the sac, at the same time that the sound was uttered, the lower jaw was also a little protruded.

high, and is a native of most parts of Africa and the East. As it recedes from man in its form, so also it appears different in its dispositions, being sullen, vicious, and untractable.(*g*)

THE BABOON.—Descending from the more perfect of the monkey kinds, we come to the baboon and its varieties, a large, fierce, and formidable race, that, mixing the figure of the man and the quadruped in their conformation, seem to possess only the defects of both; the petulance of the one and the ferocity of the other.

The baboon, properly so called, is from three to four feet high, very strong built, with a thick body and limbs, and canine teeth, much longer than those of men. It has large callosities behind which are quite naked and red. Its tail

into the sac; or when yawning, it was also inflated; and in all instances he would gradually empty the sac, as if he derived a pleasure from it. When the sac has been distended, I have often pressed on it, and forced the air contained within it into the mouth, the animal not evincing at the time any sign of its being an annoyance to him. When uttering the barking noise, the pouch is not inflated to the same extent as when he yawns. It has been stated in an American publication, that the use of the air-sac is for a swimming bladder. It may be said in refutation (if the assertion is not too absurd to be refuted) that the animal being one day washed in a large tub of water, although much frightened, did not inflate, or make the least attempt to inflate the sac. He is destitute of cheek-pouches as a reservoir for food.

When sleeping, he lies along either on the side or back, resting the head on the hands, and seemed always desirous of retiring to rest at sunset; but would often (I suppose from his approximation to civilization) indulge in bed some time after sunrise; and frequently when I awoke I have seen him lying on his back, his long arms stretched out, and, with eyes open, appearing as if buried in deep reflection. The sounds he uttered were various: when pleased at a recognition of his friends, he would utter a peculiar squeaking chirping note; when irritated, a hollow barking noise was produced; but when angry and frightened, or when chastised, the loud guttural sounds of *ra*, *ra*, *ra*, invariably followed.

When he walks in the erect posture, he turns the leg and foot outwards, which occasions him to have a waddling gait and bow-legged appearance. He would walk the deck, being held by his long arm, and then had a resemblance to a child just learning to walk. He has an awkward manner of drinking, by which the liquid is much wasted: he first applies his lips to the liquid, throwing the head up, which may in some degree be attributed to the prominency of the lower jaw; and if the vessel in which the liquid is contained should be shallow, he dips the paw into it, holds it over the mouth, letting the liquid drop in. I never observed him lap with the tongue when drinking; but when tea or coffee was given to him, the lingual organ was carefully protruded for the purpose of ascertaining its temperature.

At sunset when desirous of retiring to rest, he would approach his friends, uttering his peculiar chirping note, beseeching to be taken into their arms: his request once acceded to, he was as difficult to remove as Sinbad's Old Man of the Sea, any attempt to remove him being followed by violent screams; he clung still closer to the person in whose arms he was lodged, and it was difficult to remove him until he fell asleep. His tailless appearance, when the back is turned towards the spectator, and his erect posture, gives an appearance of a little black hairy man; and such an object might easily have been regarded by the superstitious as one of the imps of darkness.

The limbs from their muscular and strong prehensile power, render the animal a fit inhabitant for the forest; enabling him to spring from tree to tree with an agility that we have frequently witnessed him display about the rigging of the ship, passing down the backstays, sometimes hanging by his hands, at others by walking down them in an erect posture, like a rope-dancer, balancing himself by his long arms; or he would spring from one rope at a great distance to another, or would drop from one above to another below.

The position of the feet, when the animal walks, is turned outwards, and the great toe, which has a capability of great extension, is spread out wide, giving a broader surface to the foot; when he walks, to use a nautical phrase, "he sways the body," and stepping at once on the whole of the under surface of the foot, occasions a pattering noise, like that which is heard when a duck or any aquatic bird walks on the deck of a ship.—ARCANA OF SCIENCE, 1833.

(*g*) Omnes femellæ hujusce et precedentium, ut et fere sequentium specierum menstruali patiuntur fluxu sicut in feminis.

is crooked and thick, and about seven or eight inches long. Its snout, for it can hardly be called a face, is long and thick, and on each side of its cheeks it has a pouch, into which, when satiated with eating, it puts the remainder of its provisions. It is covered with long thick hair of a reddish brown colour, and pretty uniform over the whole body. It walks more commonly upon all fours than upright, and its hands as well as its feet are armed with long sharp claws, instead of the broad round nails of the ape kind.

(Ribbed-nose Baboon.)

An animal thus made for strength, and furnished with dangerous weapons, is found in fact to be one of the most formidable of the savage race, in those countries where it is bred. It appears in its native woods, to be impelled by two opposite passions; an hatred for the males of the human species, and a desire for women. Were we assured of these strange oppositions in its disposition from one testimony alone, the account might appear doubtful; but as it comes from a variety of the most credible witnesses, we cannot refuse our assent. From them, therefore, we learn that these animals will often assail women in a body, and force them into the woods, where they keep them against their will, and kill them when refractory.

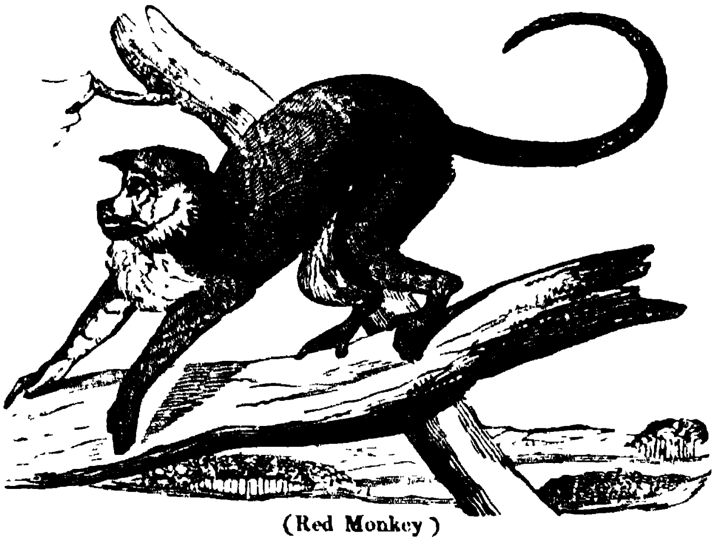
At the Cape of Good Hope they are less formidable, but to the best of their power equally mischievous. They are there under a sort of natural discipline, and go about whatever they undertake with surprising skill and regularity. When they set about robbing an orchard or a vineyard, for they are extremely fond of grapes, apples and ripe fruit, they do not go singly to work, but in large companies, and with preconcerted deliberation. On these occasions, a part of them enter the inclosure, while one is set to watch. The rest stand without the fence, and form a line reaching all the way from their fellows within to their rendezvous without, which is generally in some craggy mountain. Every thing being thus disposed, the plunderers within the orchard throw the fruit to those that are without as fast as they can gather it; or, if the wall or hedge be high, to those that sit on the top; and these hand the plunder to those next them on the other side. Thus the fruit is pitched from one to another all along the line, till it is safely deposited at their head-quarters. They catch it as readily as the most skilful tennis-player can a ball; and while the business is going forward, which they conduct with great expedition, a most profound silence is observed among them. Their sentinel, during this whole time, continues upon the watch, extremely anxious and attentive; but if he perceives any one coming, he instantly sets up a loud cry, and at this signal the whole company scamper off. Nor yet are they at any time willing to leave the place empty-handed; for if they be plundering a bed of melons, for instance, they go off with one in their mouths, one in their hands, and one under their arm. If the pursuit is hot, they drop first that from under their arm, then that from their hand; and, if it be continued, they at last let fall that which they had hitherto kept in their mouths. The natives of the Cape often take the young of these animals, and, feeding them with sheep and goats' milk, accustom them to guard their houses: which duty they perform with great punctuality.

The largest of the baboon kind is the Mandril; an ugly, disgusting animal, with a tail shorter than the former, though of a much larger stature, being from four to five feet high. The muzzle is still longer than that of the preceding; it is of a bluish colour, and strongly marked with wrinkles, which give it a frightful appearance. But what renders it truly loathsome is, that from the nose there is always seen issuing a snot, which the animal takes care at intervals to lick off with its tongue and swallow. It is a native of the Gold Coast; it is said to walk more frequently erect than upon all fours; and when displeased, to weep like a child. There was one of them shown in England some years ago. It seemed tame but stupid, and had a method of opening its mouth, and blowing at such as came too near.

The Wanderow is a baboon rather less than the former, with the body less compact and muscular, and the hinder parts seemingly more feeble. The tail is from seven to eight inches long; the muzzle is prominent as in the rest of this kind; but what particularly distinguishes it is a large, long, white head of hair, together with a monstrous white beard, coarse, rough, and descending; the colour of the rest of the body being brown or black. As to the rest, in its savage state, it is equally fierce with the others; but, with a proper education, it seems more tractable than most of its kind, and is chiefly seen in the woods of Ceylon and Malabar.

The Maimon of Buffon, which Edwards calls the Pigtail, is the last of the baboons, and in size rather approaches the monkey, being no larger than a cat. Its chief distinction, besides its prominent muzzle, like a baboon, is in the tail, which is about five or six inches long, and curled up like that of a hog; from which circumstance, peculiar to this animal, our English naturalist gave it the name. It is a native of Sumatra, and does not well endure the rigours of our climate. Edwards, however, kept one of them a year in London; and another of them happening at the same time to be exposed in a show of beasts, he brought the two exiles together, to see if they would claim or acknowledge their kindred. The moment they came into each other's presence, they testified their mutual satisfaction, and seemed quite transported at the interview.*

THE MONKEY.—The varieties in the larger tribes of the monkey kind are but few; in the ape we have seen but four, and in the baboon about as many. But when we come to the smaller class, the differences among them seem too tedious for enumeration. These, as was observed in the beginning, are all small in stature, and with long tails, by which they are distinguished from the preceding, that entirely want the tail, or are large and have but a short one. The varieties in the form and colour of dogs or squirrels, is nothing to what are found among monkeys of the smaller kind. Bosman


(Red Monkey)

(The Dog faced Baboon)

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* A DOG-FACED BABOON.—Died in February, 1828, in the Tower, after having attracted a great deal of attention during its residence in that establishment, by its extraordinary resemblance to humanity, not only in form and appearance, but also in its manners and habits The right arm, in particular, exhibited a singular likeness to the corresponding part of the human figure; so much so, indeed, that had it not been for its hairy covering, and the somewhat unusual length of the fingers, the eye, at least, might almost have mistaken it for a

mentions above fifty sorts on the Gold Coast alone, and Smith confirms the account. Condamine asserts that it would take up a volume to describe the differences of these to be found along the river Amazons; and we are sure that every one of these is very different from those on the African coast.

It is remarkable that the monkeys of two cantons are never found to mix with each other, but rigorously to observe a separation; each forest produces only its own; and these guard their limits from the intrusion of all strangers of a different race from themselves.* In this they somewhat resemble the human inhabitants of the savage nations among whom they are found, where the petty kingdoms are numerous, and their manners opposite.

In general, monkeys of all kinds, being less than the baboon, are endued with less powers of doing mischief. Indeed, the ferocity of their nature seems to diminish with their size; and when taken wild in the woods, they are sooner tamed, and more easily taught to imitate man than the former. More gentle than the baboon, and less grave and sullen than the ape, they soon begin to exert all their sportive mimickries, and are easily restrained by correction.

In their native woods they are not less the pests of man than of other animals. The monkeys, says a traveller,(g) are in possession of every forest where they reside, and may be considered as the masters of the place. Neither the tiger, nor the lion itself, will venture to dispute the dominion, since these, from the tops of trees, continually carry on an offensive war, and by their agility escape all possibility of pursuit. Nor have the birds less to fear from their continual depredations; for, as these harmless inhabitants of the wood usually build upon trees, the monkeys are for ever on the watch to find out and rob their nests; and such is their petulant delight in mischief, that they will fling their eggs against the ground when they want appetite or inclination to devour them.

There is but one animal in all the forest that ventures to oppose the monkey, and that is the serpent. The larger snakes are often seen winding up the trees where the monkeys reside; and, when they happen to surprise them sleeping, swallow them whole before the little animals have time to make a defence. In this manner, the two most mischievous kinds in all nature keep the whole forest between them; both equally formidable to each other, and for ever employed in mutual hostilities. The monkeys in general inhabit the tops of the trees, and the serpents cling to the branches nearer the bottom; and in this manner they are for ever seen near each other, like enemies in the same field of battle.

portion of some brawny blacksmith or hero of the ring. Our deceased friend, we understand, used, at all events, to brandish his pot of porter by its assistance, in a style that would have done honour to any of us; and would swill it off, apparently with quite a human relish. His attentions to a dog that used to be a frequent visiter at his cage, were, we are told, in the very best style of dignified patronizing; nor did the little favourite seem to recognise any difference between the pet of his brother quadruped's paw, and that of the whiter-skinned and shorter-fingered animal. This jolly tippler, however, "life's idle business o'er," sunk at last under a confirmed dropsy, the effect, we fear, of his plentiful potations, leaving only the memory of his fate as a warning to all surviving debauchees.—Arcana of Science, 1829.

* White Monkey.—A perfectly white monkey was caught in April, 1827, at Ramree. The hair on its body was white, curly, and soft as silk. The animal was reckoned of a very rare description; so much so, as to excite great wonder and admiration among the natives, who represented that such a creature had never but once, to their knowledge, been seen in those parts; and then the king of Ava sent down a golden cage, with a host of people to escort the animal to the golden presence, and expended, besides, 20,000 rupees in sacrifices and public rejoicings; auguring, from the arrival of the extraordinary stranger, the most happy presages of good fortune. In the present instance, the creature was unfortunately of too young and tender an age when caught. A Burmese froman, who was nursing an infant of her own, requested permission to suckle it, and very fairly divided her maternal attention between the two. The animal lived in apparent good health and spirits for six days; but, whether it was that its nursing disagreed with it, or that it was naturally very delicate, it died on the seventh day.—Arcana of Science, 1828.

(g) Description Historique de Macacar, p. 51

The enmity of these animals to mankind is partly ridiculous and partly formidable. They seem, says Le Comte and others, to have a peculiar instinct in discovering their foes; and are perfectly skilled, when attacked, in mutually defending and assisting each other. When a traveller enters among these woods, they consider him as an invader upon their dominions, and join all to repel the intrusion. At first they survey him with a kind of insolent curiosity. They jump from branch to branch, pursue him as he goes along, and make a loud chattering, to call the rest of their companions together. They then begin their hostilities by grinning, threatening, and flinging down the withered branches at him, which they break from the trees: they even take their excrements in their hands, and throw them at his head. Thus they attend him wherever he goes; jumping from tree to tree with such amazing swiftness that the eye can scarce attend their motions.

The curiosity of the Europeans has, in some measure, induced the natives of the places where these animals reside to catch or take them alive by every art they are able. The usual way, in such case, is to shoot the female as she carries her young, and then both, of course, tumble to the ground. But even this is not easily performed; for, if the animal be not killed outright, it will not fall—but, clinging to some branch, continues, even when dead, its former grasp, and remains on the tree where it was shot until it drops off by putrefaction. In this manner it is totally lost to the pursuer; for to attempt climbing the tree, to bring either it or the young one down, would probably be fatal, from the number of serpents that are hid among the branches. For this reason the sportsman always takes care to aim at the head; which, if he hits, the monkey falls directly to the ground, and the young one comes down, at the same time, clinging to its dead parent.

The Europeans, along the coast of Guinea, often go into the woods to shoot monkeys; and nothing pleases the negroes more than to see these animals drop, against which they have the greatest animosity. They consider them, and not without reason, as the most mischievous and tormenting creatures in the world; and are happy to see their numbers destroyed upon a double account—as well because they dread their devastations, as because they love their flesh. The monkey, which is always skinned before it is eaten, when served up at a negro feast, looks so like a child that an European is shocked at the very sight. The natives, however, who are not so nice, devour it as one of the highest delicacies, and assiduously attend our sportsmen to profit by the spoil.

The negroes consider these animals as their greatest plague; and, indeed, they do incredible damage when they come in companies to lay waste a field of Indian corn or rice, or a plantation of sugar-canes. They carry off as much as they are able, and they destroy ten times more than they bear away. Their manner of plundering is pretty much like that of the baboons, already mentioned, in a garden.

The chief food of the monkey tribe is fruits, the buds of trees, or succulent roots and plants. They all, like man, seem fond of sweets; and, particularly, the pleasant juice of the palm-tree and the sugar-cane. With these the fertile regions in which they are bred seldom fail to supply them; but when it happens that these fail, or that more nourishing food becomes more agreeable, they eat insects and worms; and, sometimes, if near the coasts, descend to the sea-shore, where they eat oysters, crabs, and shell-fish. (*g*)

(*g*) Habits of Monkeys.—Their manner of managing an oyster is extraordinary enough, but it is too well attested to fail of our assent. As the oysters in the tropical climates are generally larger than with us, the monkeys, when they go to the sea-side, pick up a stone and clap it between the opening shells: this prevents them from closing, and the monkey then eats the fish at his ease. They often also draw crabs from the water by putting their tail to the hole where that animal takes refuge, and the crab fastening upon it, they withdraw it with a jerk, and thus pull their prey upon shore. This habit of laying traps for other animals makes them very cautious of being entrapped themselves; and I am assured, by many persons of credit, that no snare, how nicely baited soever, will take the monkey of the West Indian Islands; for, having been accustomed to the cunning of man, it opposes its natural distrust to human artifice.

The monkey generally brings forth one at a time, and sometimes two. They are rarely found to breed when brought over into Europe; but of those that do, they exhibit a very striking picture of parental affection. The male and female are never tired of fondling their young one. When in a state of domestic tameness, these animals are very amusing, and often fill up a vacant hour when other amusement is wanting. There are few that are not acquainted with their various mimickries, and their capricious feats of activity. But it is generally in company with other animals of a more simple disposition that their tricks and superior instincts are shown: they seem to take a delight in tormenting them; and I have seen one of them amusing itself for hours together in imposing upon the gravity of a cat.(g)

As of all savages those of Africa are the most brutal, so, of all countries, the monkeys of Africa are the most expert and entertaining. The monkeys of America are, in general, neither so sagacious nor so tractable, nor is their form so nearly approaching that of man. The monkeys of the new continent may be very easily distinguished from those of the old by three marks. Those of the ancient continent are universally found to have a naked callous substance behind, upon which they sit, which those of America are entirely without: those also of the ancient continent have the nostrils differently formed, more resembling those of men, the holes opening downward; whereas the American monkeys have them opening on each side: those of the ancient world have pouches on each side the jaw, into which they put their provisions, which those of America are without; lastly, none of the monkeys of the ancient continent hang by the tail, which many of the American sorts are known to do. By these marks the monkeys of either continent may be readily distinguished from each other, and prized accordingly. The African monkey, as I am assured, requires a longer education, and more correction, than that of America; but it is at last found capable of more various powers of imitation, and shows a greater degree of cunning and activity.

Buffon, who has examined this race of imitative beings with greater accuracy than any other naturalist before him, makes but nine species of monkeys belonging to the ancient continent, and eleven belonging to the new. To all these he gives the names which they go by in their respective countries; which, undoubtedly, is the method least liable to error, and the most proper for imitation.*

THE MAKI.—The last of the monkey kind are the Makies; which have no other pretensions to be placed in this class, except that of having hands like the former, and making use of them to climb trees or to pluck their food. The first of this kind is the Mococo; a beautiful animal, about the size of a common cat, but the body and limbs slenderer, and of a longer make. It has a very long tail, at least double the length of its body; it is covered with fur, and marked alternately with broad rings of black and white. But what it is chiefly remarkable for, besides the form of its hands and feet, is the largeness of its eyes, which are

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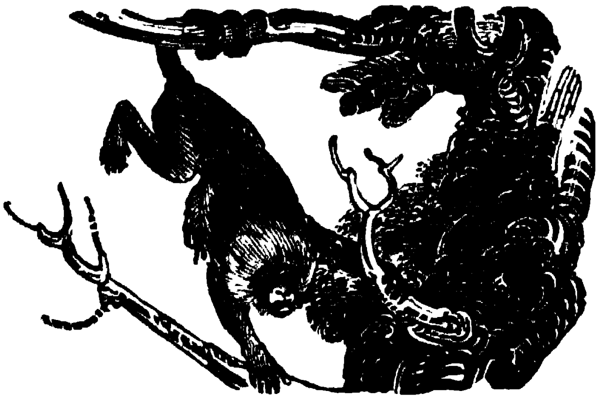
(g) Anecdote.—Erasmus tells us of a large monkey, kept by Sir Thomas More, that, one day diverting itself in his garden, where some tame rabbits were kept, played several of its usual pranks among them, while the rabbits scarce well knew what to make of their new acquaintance. In the mean time, a weasel, that came for very different purposes than those of entertainment, was seen peering about the place in which the rabbits were fed, and endeavouring to make its way by removing a board that closed their hutch. While the monkey saw no danger, it continued a calm spectator of the enemy's efforts; but just when, by long labour, the weasel had effected its purpose, and had removed the board, the monkey stepped in, and, with the utmost dexterity, fastened it again in its place; and the disappointed weasel was too much fatigued to renew its operations.

* Varieties of this Species.—Of the great number of species, upwards of one hundred which are now known and characterized, very few are distinguished from their immediate fellows by striking and strongly-marked characters, either physical or moral. Th groups, too, are connected by such gradua and easy transitions, that although the typica forms of each, isolated from the mass and placed in contrast with each other, unquestionably exhibit many broadly-distinguishing peculiarities, yet the entire series offers a chain so nearly complete and unbroken as scarcely to admit of being treated of in any other way than as one homogeneous whole.—Griffith.

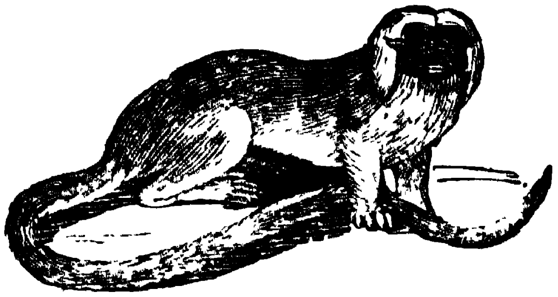


(The Ring-tailed Monkey.)

surrounded with a broad black space, and the length of the hinder legs, which by far exceed those before. When it sleeps, it brings its nose to its belly, and its tail over its head. When it plays it uses a sort of galloping, with its tail raised over its back, which keeps continually in motion. The head is covered with dark ash-coloured hair; the back and sides with a red ash-colour, and not so dark as on the head; and the whole glossy, soft, and delicate, smooth to the touch, and standing almost upright, like the pile of velvet. It is a native of Madagascar; appears to be a harmless, gentle animal; and though it resembles the monkey in many respects, it has neither its malice nor its mischief: nevertheless, like the monkey, it seems to be always in motion; and moves, like all four-handed animals, in an oblique direction.

A second of this kind, which is also a native of Madagascar, is the Mongooz; which is less than the former, with a soft, glossy robe, but a little curled. The nose also is thicker than that of the mococo; their eyes are black, with orange-coloured circles round the pupil, and the tail is of one uniform colour. As to the rest, it is found of various colours, some being black, others brown; and its actions somewhat resemble those of a monkey.

The Vari is much larger than either of the former; its hair is much longer, and it has a kind of ruff round the neck, consisting of very long hair, by which it may be easily distinguished from the rest. It differs also in its disposition, which is fierce and savage; as also in the loudness of its voice, which somewhat resembles the roaring of the lion. This also is a native of Madagascar.



(The Red-tailed Monkey.)

To this tribe we may refer a little four-handed animal, of the island of Ceylon, which Buffon calls the Lori, very remarkable for the singularity of its figure. This is, of all other animals, the longest in proportion to its size, having nine vertebræ in the loins; whereas other quadrupeds have only seven.(*g*) The body appears still the longer by having no tail. In other respects, it resembles those of the maki kind, as well in its hands and feet, as in its snout, and in the glossy qualities of its hair. It is about the size of a squirrel; and appears to be a tame, harmless, little animal.

THE VARIED MONKEY, OR MONA, is the best known of all the monkey tribe, being more frequently brought into Europe than any other. It is a native of Barbary and other northern parts of Africa, Arabia, and Persia, where it is called the Mona, from which our general term is derived.

Its nose is short and thick; its face of a dark lead colour; the beard on each side long, and of a greenish yellow; the top of the head is bright yellow, freckled with black; back and sides deep brown, with black freckles; legs, feet, and tail, black; inside of the thighs of a pale blue colour, thinly covered with whitish hairs; and on each side of the rump, close by the tail, is a large white spot.

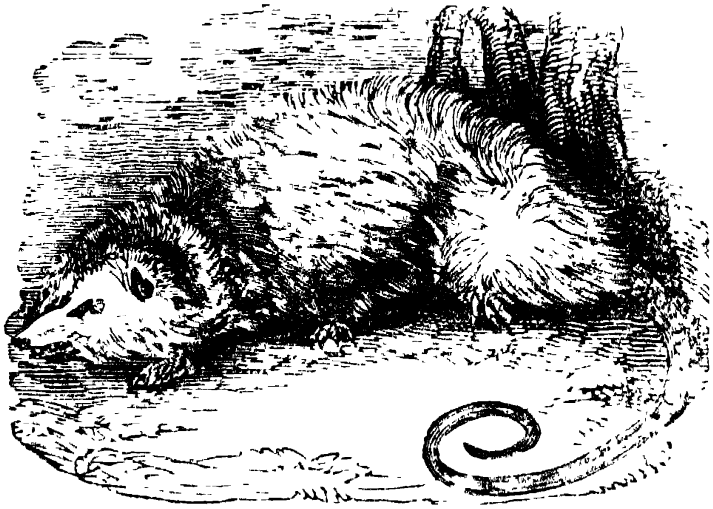
(*g*) Buffon, vol. xxvi. p. 274.

Bewick illustrates one in his work, from a living specimen, which he says was remarkably gentle, tame, and familiar; and seemed to have some attachment to those with whom it was acquainted. Its length was eighteen inches; tail about two feet. It was fed with bread, roasted meat, and fruit of all kinds, of which t was particularly fond.

(The Mona Monkey.)

THE OPPOSSUM, AND ITS KINDS.—To these four-handed animals of the ancient continent, we may add the four-handed animals of the new, that use their hands like the former, as well as their tails, and that fill up the chasm between the monkey tribe and the lower orders of the forest.

The first and the most remarkable of this tribe is the Oppossum, an animal found both in North and South America, of the size of a small cat. The head resembles that of a fox; it has fifty teeth in all; but two great ones in the midst, like those of a rat. The eyes are little, round, clear, lively, and placed upright; the ears are long, broad, and transparent, like those of the rat kind; its tail also increases the similitude, being round, long, a little hairy in the beginning, but quite naked towards the end. The fore legs are short, being about three inches long, while those behind are about four. The feet are like hands, each having five toes or fingers, with white crooked nails, and rather longer behind than before. But it is particular in this animal that the thumb on the hinder legs wants a nail; whereas the fingers are furnished with clawed nails as usual.



(The Virginian Oppossum.)

But that which distinguishes this animal from all others, and what has excited the wonder of mankind for more than two centuries, is the extraordinary conformation of its belly, as it is found to have a false womb, into which the young, when brought forth in the usual manner, creep, and continue for some days longer to lodge and suckle securely. This bag, if we may so call it, being one of the most extraordinary things in natural history, requires a more minute description.* Under the belly of the female is a kind of slit or opening, of about three inches long: this opening is composed of a skin, which makes a bag internally, which is covered on the inside with hair, and in this bag are the teats of the female, and into it the young, when brought forth, retire, either to suckle or to escape from danger. This bag has a power of opening and shutting at the will of the animal; and this is performed by means of several muscles, and two bones, that are fitted for this purpose, and that are peculiar to this animal only. These two bones are placed before the *os pubis*, to which they are joined at the base; they are about two inches long, and grow smaller and smaller to their extremities. These support the muscles that serve to open the bag, and give them a fixture. To these muscles there are antagonists, that serve, in the same manner, to shut the bag; and this they perform so exactly, that in the living animal the opening can scarcely be discerned, except when the sides are forcibly drawn asunder. The inside of this bag is furnished with glands that exude a musky substance, which communicates to the flesh of the animal, and renders it unfit to be eaten. It is not to be supposed that this is the place where the young are conceived, as some have been led to imagine; for the oppossum has another womb, like that of the generality of animals, in which generation is performed in the ordinary manner. The bag we have been describing may rather be considered as a supplemental womb. In the real womb the little animal is partly brought to perfection; in the ordinary one it receives a kind of additional incubation; and acquires at last strength enough to follow the dam wherever she goes. We have many reasons to suppose that the young of this animal are all brought forth prematurely, or before they have acquired that degree of perfection which is common in other quadrupeds. The little ones, when first produced, are in a manner but half completed; and some travellers assert that they are at that time not much larger than flies. We are assured, also, that, immediately on quitting the real womb, they creep into the false one, where they continue fixed to the teat until they have strength sufficient to venture once more into the open air, and share the fatigues of the parent. Ulloa assures us that he has found five of these little creatures hidden in the belly of the dam three days after she was dead, still alive, and all clinging to the teat with great avidity. It is probable, therefore, that, upon their first entering the false womb, they seldom stir out from thence; but when more advanced they venture forth several times in the day; and, at last, seldom make use of their retreat, except in cases of necessity or danger. Travellers are not agreed in their accounts of

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* Pouched Animals.—This race was known at first only in America: all the species found on that continent agree so completely in general organization, as well as in this peculiar conformation of the genitals, that Linnæus found in them the [illegible]

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a single genus, which he called *Didelphis*, or double wombed.

Afterwards, from the East Indies, and still later from the regions of Australasia, animals arrived, equally distinguished by the possession of the abdominal pouch.

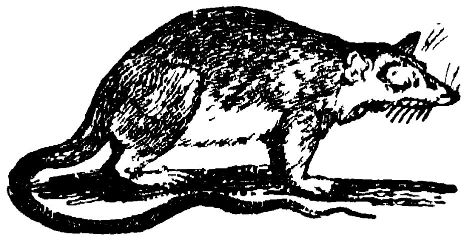
At first, an opinion arose that the young of these animals were actually produced in the abdominal pouch beside the mammæ of the mother. This notion is also common in Virginia even among physicians. Beverly says that the young oppossum exists in the false belly, without ever entering the true, and are developed on the teats of the mother Two oppossums, male and female, were domesticated in the house of M. d'Aboville, in 1783; these animals copulated, and the effects were attentively observed by that gentleman. In about ten days the edge of the orifice of the pouch grew thicker—a phenomenon which afterwards grew more perceptible. As the pouch increased in size, the orifice widened. On the thirteenth day, the female did not quit her retreat except to eat, drink, and evacuate: on the fourteenth she did not stir from it. M. d'Aboville then determined to seize and examine her: the pouch, the aperture of which had widened before, was now nearly closed; a slimy secretion moistened the hairs on its circumference. On the fifteenth day, a finger was introduced into the pouch, and a round body about the size of a pea was plainly felt at the bottom. This examination was made with difficulty, on account of the impatience of the mother, who had before this been always very mild and tranquil. On the seventeenth, she permitted a further examination, and M. d'Aboville discovered two bodies about the size of a pea. There was, however, a great number of these young ones. On the twenty-fifth day, they moved very perceptibly, yielding to the touch; on the fortieth, the pouch was sufficiently open for them to be plainly distinguished; and on the sixtieth, when the mother lay down, they were seen hanging to the teats, some outside the pouch, some inside. The nipple is about two-eighths of an inch in length; but it soon dries up, and at last drops off, after the manner of the umbilical cord.—CUVIER.

the time which these animals take to continue in the false womb: some assure us they remain there for several weeks; and others, more precisely, mention a month. During this period of strange gestation, there is no difficulty in opening the bag in which they are concealed: they may be reckoned, examined, and handled, without much inconvenience; for they keep fixed to the teat, and cling there as firm as if they made a part of the body of the animal that bears them. When they are grown stronger, they drop from the teat into the bag in which they are contained; and, at last, find their way out in search of more copious subsistence. Still, however, the false belly serves them for a retreat, either when they want to sleep or to suckle, or when they are pursued by an enemy. The dam, on such occasions, opens her bag to receive them, which they enter,

> ——— Pars formidine turpi
> Scandunt rursus equum et nota conduntur in alvo.

The oppossum, when on the ground, is a slow, helpless animal: the formation of its hands are alone sufficient to show its incapacity of running with any degree of swiftness; but, to counterbalance this inconvenience, it climbs trees with great ease and expedition.(g) It chiefly subsists upon birds, and hides among the leaves of the trees to seize them by surprise. It often also hangs by the tail, which is long and muscular; and, in this situation, for hours together, with the head downwards, it keeps watching for its prey. If any lesser animal, which it is able to overcome, passes underneath, it drops upon it with deadly aim and quickly devours it. By means of its tail, the oppossum also slings from one tree to another, hunts insects, escapes its pursuers, and provides for its safety. It seems to be a creature that lives upon vegetables, as well as animal substances, roots, sugar-canes, the bark, and even the leaves of trees. It is easily tamed, but it is a disagreeable domestic, as well from its stupidity and figure as its scent, which, however fragrant in small quantities, fails not to be ungrateful when copiously supplied.

An animal, greatly resembling the former,(g) is the Marmose, which is found in the same continent. It seems only to differ in size, being less; and, instead of a bag to receive its young, has only two longitudinal folds near the thighs, within which the young, which are prematurely brought forth, as in the last instance, continue to suckle. The young of these, when first produced are not above the size of a bean, but continue sticking to the teat until they have arrived at greater maturity.


(The Mexican Oppossum.)

The Cayopolin is somewhat larger than the former; and a good deal resembling it in habits and figure, except that its snout is more pointed, its tail longer in proportion, and its colour different, being of an ash, somewhat inclining to yellow; however, I should suppose it to be only a variety of the former.

To this number we may add the Phalanger, so called by Buffon; a good deal resembling the former, but distinguished by the fashion of its hinder hands; the thumb and the fore finger being joined together, except at the extremities. This animal is about the size of a rat; and has, accordingly, by some been called the Rat of Surinam.

(The Phalanger.)

The last animal of this class is called, by Buffon, the Tarsier. This extraordinary little animal resembles the former in having four hands and a long tail, but it differs very much in the extreme length of its hinder legs, which are longer than the rest of its whole body. The bones of that part of the foot called the tarsus are likewise so very long that from thence the animal has received its name: the tail is naked in the middle and hairy only at both extremities: its hair is woolly, soft, and a deep ash colour. As to the rest, it is unknown from what country this animal was brought; but the naturalist, from whom we have its description, supposes it to be a native of America.

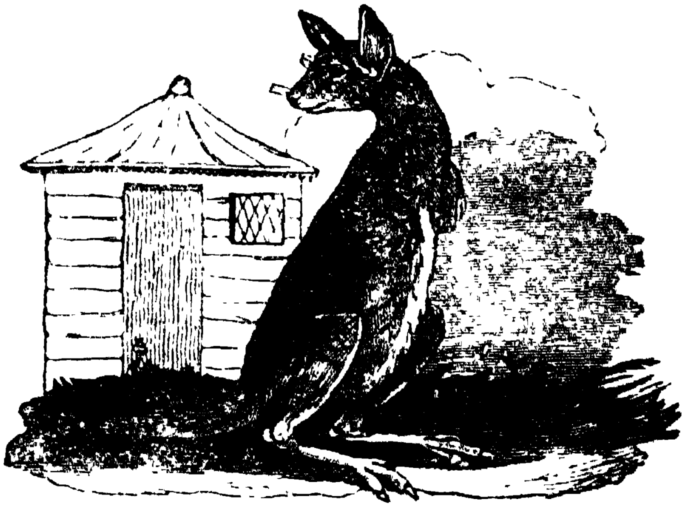
(g) Buffon, vol. xxi. p. 174.

(g) Ibid., p. 212.

CHAP. XXI.

OF THE KANGAROO.*

NEARLY allied to the last kind in having a pouch for the security of its young, but differing in many other particulars of its form and manners, is the Kangaroo. The first discovery of this singular animal was made in 1770, during the period in which our celebrated navigator, Capt. Cook, was exploring that part of the coast of Australia which is now called New South Wales.



(The Kangaroo.)

"On Friday, June 22nd, (he says,) a party who were engaged in shooting pigeons for the use of the sick of the ship, saw an animal which they described to be as large as a greyhound, of a slender make, of a mouse colour, and extremely swift." The following day the same kind of animal was again seen by a great many other people. On the 24th it was seen by Capt. Cook himself, who, walking at a little distance from the shore, observed a quadruped, which he thought bore some resemblance to a greyhound, and was of a light mouse colour, with a long tail, and which he should have taken for a kind of wild dog, had not its extraordinary manner of leaping, instead of running, convinced him of the contrary. Sir Joseph (then Mr.) Banks, whose association with Capt. Cook rendered that voyage so peculiarly fortunate for the interests of natural history, having obtained a transient view of it, immediately concluded it to be an animal perfectly new and undescribed.

On the 17th of July, this gentleman, accompanied by a small party, went out at dawn of day in quest of discoveries in natural history; and, in a walk of many miles, at length saw four of these animals, two of which were chased by his greyhound, but readily outstripped their pursuer, and threw him out to a great distance by leaping over the long grass, which prevented the dog from running to advantage. All that could then be distinctly observed was, that the animal in some degree resembled the Jerboa in its manner of springing forward on the hind legs, instead of running in the manner of other quadrupeds.

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* The kangaroo is a discovery since the time of Goldsmith, we therefore insert all that is interesting of that animal from the observations of subsequent naturalists.—ED.

The sight of a creature so extraordinary could not fail to excite, in the mind of a philosophic observer, the most ardent wishes for a complete examination. These were at length gratified: Mr. Gore, one of the associates in the expedition of Capt. Cook, having been so fortunate as to shoot one in the course of a few days; and it seems to have been from this specimen that the figure given in Hawksworth's Voyage was drawn.

The term Kangaroo is borrowed from the natives of Australia; and the last syllable of this word, it may be observed, seems to be a generic appellative signifying " quadruped " or " beast," for we find it again in Poto-*roo*, by which they designate the Kangaroo Rat; Wha-tapoa-*roo*, the native name for the Lemurine Oppossum; and in Hepoona-*roo*, the native name of the Petaurus, or Flying Oppossum.

The labours and researches of modern naturalists have been repaid by the discovery of several other species of kangaroo, in addition to the large one first seen and described. One of the most elegant of the species is the banded kangaroo, discovered by the French naturalists, Péron and Le Sueur.*

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* GENUS MACROPUS.—This genus is divided into two groups; but of the various individuals, we content ourselves with a note on the Fasciated Kangaroo, the most elegant species of this extraordinary race. It is scarcely so large as a rabbit, and is easily distinguishable from all the other known species by twelve or fifteen bands disposed transversely across the back: these bands are narrow, of a reddish brown colour, less regular and decided over the shoulders, where they commence, but becoming more distinct and of a deeper brown as they descend towards the tail, at the base of which they terminate. The bands are gradually lost on the sides of the body, and no trace of them can be perceived at the under part. The head and the feet of a light yellow colour; the under part of the body is of a clear grey approaching to white; the rest of the body is the colour of a hare, more or less deep in different individuals. The ears in this species are proportionately shorter than in any other; it is the same with respect to the tail, which, being deprived of hair, presents considerable resemblance to that of a very large rat. In other respects, the pyramidable form of the body, the disproportionate size of the hind legs, the disposition and proportions of the toes and claws, are the same as in other kangaroos.

The banded or fasciated kangaroo inhabits the three islands called after Bernier, Doore, and Dirk-Hattraich, and has not been met with on the continent of Australia, or in any other of the islands which the French naturalists successively touched at. They also remark that the other species of kangaroo seem to be confined to a similarly limited range of country; to be fixed by nature to such and such islands, without any individual appearing to break the limits assigned to its species. The smaller species of kangaroo, being comparatively deprived of any means of attack or defence, resemble, in their gentle and timid character, the hares and other feeble quadrupeds of our own climates. The slightest noise alarms them; a breath of wind agitating the bushes is sufficient to put them to flight. On this account, notwithstanding their great abundance at the Island of Bernier, their capture was extremely difficult and precarious. Concealed and defended by the impenetrable jungles, these animals were enabled to brave with impunity the craft and activity of their pursuers. When driven at last from these asylums, they escaped by unknown routes, and darted rapidly across the open space to some neighbouring bush, through the inextricable intertexture of which it seemed inconceivable how these delicate creatures could force a passage; but, upon a closer examination, it was found that they had formed in every bush many little covered ways, commencing at different parts of the circumference, and leading to the centre of the jungle, from which, when attacked, they could select an outlet from among numerous different routes. But these attempts at escape were mostly fatal to them when the outlets were once discovered; as, in that case, the hunters stationed themselves in readiness to knock down the affrighted animals, while others beat the bushes with long staves to scare them from their hiding-place. To the French naturalists abovementioned, the flavour of these animals resembled that of the hare, but was more aromatic, in consequence of the peculiar nature of the plants on which they fed, which were all of an odoriferous kind. They assert that this species affords by far the best food of any of the kangaroo kind, and strongly recommend its introduction into Europe, both on that ground, as well as its beauty.

" At the period," they observe, " when we were on these coasts, all the full-grown females had in their pouch a tolerably sized young one, which they strove to defend and preserve with an admirable degree of courage. When wounded, they fled, bearing along their young one in the pouch, and did not abandon it until being overcome with fatigue, and ex-

All these animals are remarkable for the extreme disproportion subsisting between their fore and hind extremities. One might almost say that the whole of the upper part of the body had been in some measure sacrificed to the lower.

hausted by loss of blood, they were unable any longer to carry it; then they would stop, and sitting upright on their hind legs, would assist the young one out of the pouch with their fore legs, and endeavour, as it were, to direct it to the place where it could find the most easy means of escape. Thus disembarrassed, they would then continue their flight with as much rapidity as their powers would permit; but if the pursuit was given over or slackened, they would then be seen to return to the bush which protected their young; to call them by a sort of grunt peculiar to them; and, on their return, affectionately to caress them as if to dissipate their alarm, again to receive them in the pouch, and to seek, with their beloved burthen, some other jungle remote from the persecution of the hunter. Similar proofs of intelligence and affection, but still more touching, were exhibited by the poor mothers when they felt themselves mortally wounded; all their cares were then directed to the safety of their offspring; far from seeking to save themselves, they would stand still beneath the blows of the hunter, and their last efforts would be given to the preservation of their young. Generous devotion! of which the history of animals offers so many examples, and which we are often reduced to envy.

"During our sojourn at the Island of Bernier, we took several of these young kangaroos; they were, however, too feeble, and survived their captivity but a short time. One alone lived and became tame: this animal ate bread with readiness, and was particularly fond of the sugared water which was offered to it. This last taste seems the more extraordinary, as, in the desert islands which these animals inhabit, every kind of fresh water is constantly wanting. This young kangaroo was killed accidentally at Timor: we felt its loss the less sensibly, because, having but one, we could not hope to have naturalized it in Europe; but this first attempt is enough to prove with certainty, that this species can accommodate itself very readily to the cares and society of man; and we repeat, that it would be a valuable acquisition for our parks and pleasure grounds."

The pouch abovementioned, which Nature has given the kangaroo for the defence and shelter of her offspring, is not confined to this genus, but is found in females of all the quadrupeds of New Holland, with the exception of the native dog, a species of water-rat, the paradoxical platypus, and the porcupine ant-eater; the two latter have, however, the peculiar bones which, from a supposition of their supporting the pouch, have been termed by anatomists the marsupial bones. The naturalist has borrowed a term from the same source to designate the animals endowed with this abdominal bag; and all the great Australian family of quadrupeds, together with the oppossums of America, are included by Cuvier in an order called *Marsupiata*, marsupial or pouched animals. The young in all this tribe are received into the pouch when of an extremely minute size, and there acquire, as in a second womb, their principal growth. It was from this peculiarity that Linnæus gave to the genus most anciently known, the epithet *Didelphis*. The peculiarity of this mode of generation has rendered it a subject of great interest in a scientific point of view.

Some of the particulars that have been noticed may be briefly alluded to. The Count Aboville attentively watched a pair of oppossums which he kept in his house. On the fifteenth day of gestation he found, on introducing his finger into the pouch, a round body of the size of a pea; on the seventeenth day he could detect two similarly formed bodies; on the sixtieth day a number of young ones could be seen in the pouch, hanging from the teats.

Dr. Barton, an American physician, has observed that the young oppossum is born without form, a mere gelatinous mass, without trace of eyes or ears, weighing not more than a single grain, though coming from a parent as large as a rat. These germs adhere to the nipple, and grow from thence without quitting it till they attain the size of a rat; they then return to the pouch for the purposes of sucking, or when they require shelter. According to him, uterine gestation lasts from twenty-one to twenty-six days.

M. Rengger, also, states that the gestation of the oppossum, observed in a species he has termed *Didelphis Azaræ*, lasts twenty-five days; but, according to this author, the young, when they are received into the pouch, are half an inch in length, naked, with the head very large, the eyes closed, the nostrils and the mouth open, the ears folded, the fore and hind legs crossed in front of the body, and the tail turned towards the same part. In this state, they manifest no signs of life when touched or irritated. Shortly after birth, they are found suspended by the mouth to the nipples, but without being coherent with them. They remain attached to the nipples seven weeks, when their eyes are for the first time opened; they then begin to quit the pouch—a sort of second birth; and afterwards return to it at intervals for nourishment and protection.—ZOOLOGICAL MAGAZINE.

The hinder limbs possess an astonishing power, from their bulk and length; while the tail, from its thickness and the strength of its muscles, seems, as it were to form a fifth extremity. The fore legs, on the contrary, are very slim and small; the neck tapers to the head, which is itself small and tapering. This conformation permits them to assume and maintain the erect position, during which the tail forms with the hind legs a firm tripod, or basis of support, the disarrangement of whose equilibrium is little risked by the lightness of the superincumbent parts; and the kangaroo in this position derives additional support and stability from the length of its feet—a peculiarity from which the generic term *Macropus* is derived. The fore feet are armed with five strong claws, which are of a three-sided figure, with a flat surface below, and slightly arched; the toes are very free and movable, and thus adapted in some degree for grasping. The hind feet have only four toes, the two innermost of which are rudimentary, and enveloped in a single sheath of skin as far as the claws, which are small, curved, and distinct; the next toe is very large and long, armed with a very powerful sharp-pointed claw, or rather elongated hoof, with which the kangaroo can inflict very severe wounds: the outer toe is almost as strong as the preceding, but is shorter and its claw somewhat weaker: the under surface of the foot is naked as far as the projecting heel or hock; the leg is twice the length of the thigh. The hair of the kangaroo is of two kinds, silky and woolly; the first kind is only found on the limbs, the head, and the tail, whilst the woolly hair covers all the rest of the body; a few short, black, stiff bristles appear on the upper lip, the eyebrows, and beneath the eyes and the throat. The eyes are large with a mild expression, the pupils large and round; the ears are of a moderate size and simple structure; the nostrils are patulous and surrounded by a hair-clad skin; the tongue is smooth; and the upper lip divided, like that of the hare or rabbit. They are herbivorous animals, generally living in small troops under the guidance of an old male, frequenting the wooded regions of Australia, but readily propagating in our climate; and since their flesh is esteemed for its flavour, they might form a useful addition to our stock of domesticated animals, as well as an ornament to our parks and forests.

They appear to be a very hardy race: the naturalists who accompanied M. Freycinet relate that in the sterile region of the Bay of Seals, where there is an absolute want of fresh water, the kangaroos still find a subsistence, and satisfy their thirst with sea-water. On board ship, although from their digestive system essentially herbivorous, yet they would eat any kind of viand, as bread, sugar, and even salt beef, or old leather, &c.; they would also drink wine or brandy. We have heard that advantage has occasionally been taken of this aptitude to drink intoxicating liquors, to occasion the ludicrous spectacle of their singular modes of progressive motion as modified by a state of inebriation.

In their more leisurely motions as quadrupeds, with the four legs on the ground, they raise the hinder part of the body by making use of their tail as a prop or support, then carrying the hind legs past the fore legs they rest them on the ground, and simultaneously throw forward the fore legs and the tail—on which again the body is supported while the hind legs are again brought forward, &c.; but, when pushed to a swifter motion, they make leaps of from twenty to thirty feet in extent, and from six to nine in height, clearing the obstacles which impede their less gifted pursuers, and using the tail as an essential instrument in this vigorous species of locomotion.

The kangaroo is hunted by the colonists with a strong race of dog, partaking of the qualities of the greyhound and staghound. It is observed, when hard pressed by these pursuers in the open plains, not to use the saltatory mode of progression, but to run on its four legs, leaping only when it has an obstacle to overcome; for it appears that the tail cannot be brought with sufficient rapidity into the position necessary for the performance of its part in the leap, to enable the kangaroo to escape by this means when on level and unobstructed ground. The chase is not without its dangers to the dogs. The kangaroos inflict stunning blows with their heavy and muscular tail; the kick from the hind leg is often fatal, and always inflicts a severe wound; the strong males will also grapple with the dog, and, whilst they hold it fast in the fore paws, they will tear open the belly of their enemy with the strong hinder claws.

The period of gestation in the kangaroo is not yet ascertained, but the young is received into the marsupium, or external pouch, when of very small size. Sir Everard Home found one attached to the nipple which weighed twenty-one grains, and measured an inch without the tail; its fore paws were tolerably well formed, and double the length of the hind ones. "When the young," he observes, "is first attached to the nipple, the face appears to be wanting, except a round hole at the muzzle, to which the nipple is applied and adheres; soon after, the lips and jaws grow upon the nipple, till at last nearly half an inch of its length is inclosed in the mouth."

According to some notes made by a keeper on a kangaroo which belonged to the Duchess of Berri, it would appear that gestation had continued from the 6th of May to the 6th of October, viz. five months; and that the young one remained in the pouch till the January following, when it quitted the nipple and came out. The exact period, however, of gestation in the kangaroo, the form and condition of the embryo at birth, and the precise manner in which it passes or is conveyed into the pouch, are points which still remain to be decided.*

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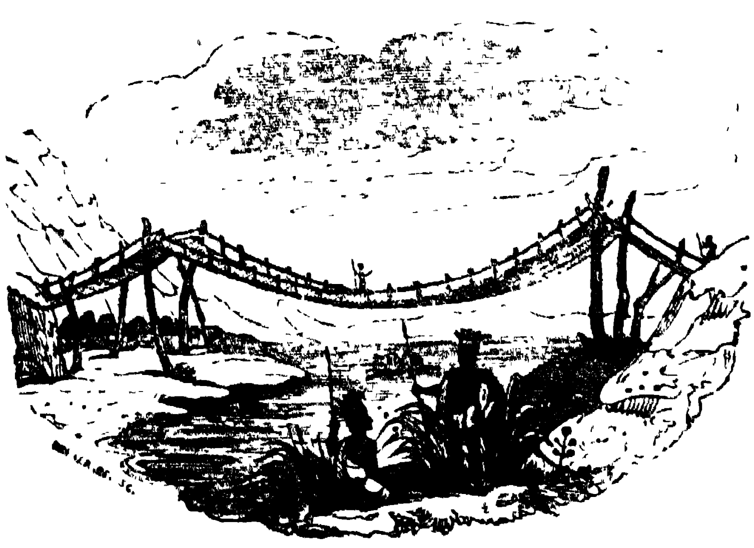
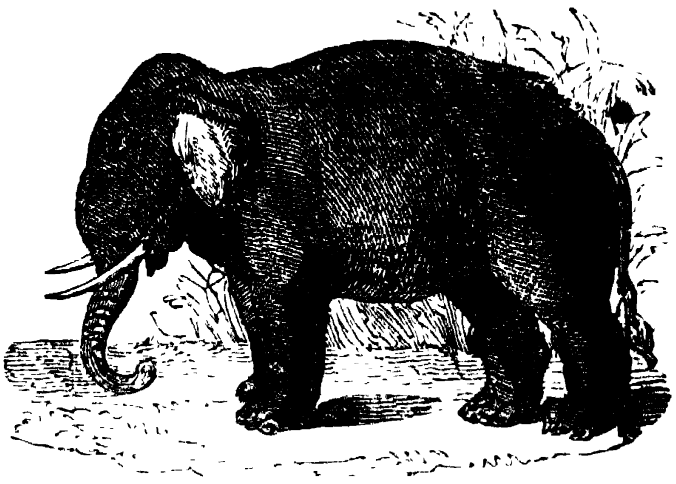
* "In examining the formation and habits of the kangaroo, and the nature of the country in which it is found, we shall be forcibly struck with the truth of what has been remarked respecting the beneficent provisions observable throughout the animal kingdom for the preservation of the various creatures which compose it. The kangaroo inhabits a country where there are enormous tufts of the coarsest grass, growing in swamps and marshy ground, each tuft being several feet in height, and at a considerable distance from each other, or else they frequent rocky or bushy ground. By means of the great strength of their tail and hind feet, they can even make bounds in succession of from twelve to twenty feet in length, and several feet in height, from one tuft of grass, or from one rock or bush, to another, and thus escape from their pursuers. Nor is this all; for such is the strength and rankness of the grass in New Holland, or at least in some parts of it where the kangaroo most abounds, that if they produced their young in the manner usual with other quadrupeds, they would either wander and be lost in the high grass, or, in case the dam was obliged to leave them to provide for her own safety, it would not be easy for her to find her young again. By means, however, of the abdominal pouch, in which the young reside, and which they only leave either for exercise and amusement, they share the fate of their dam. I have, however, been assured that those kangaroos, which have been domesticated and bred in this country are gradually losing the use of the pouch as a place of refuge for their young, that the size and strength of the tail is diminishing, and that they more frequently use all four of their feet in running."—JESSE'S GLEANINGS.



CHAP. XXII.

OF THE ELEPHANT.



(The Elephant.)*

Having gone through the description of those quadrupeds that, by resembling each other in some striking particular, admit of being grouped together and considered under one point of view, we now come to those insulated sorts that bear no similitude with the rest, and that to be distinctly described must be separately considered.*

The foremost of these, and in every respect the noblest quadruped in nature, is the elephant, not less remarkable for its size than its docility and understanding. All historians concur in giving it the character of the most sagacious animal next to man; and yet, were we to

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* The Genus Elephas.—All the accurate knowledge which we at present possess relative to the mode of propagation, the growth, the disposition, and faculties of the elephant, is founded on observations made upon the Asiatic species: and it may be doubted how far we are warranted in referring the attributes of this to the less commonly known elephant, which ranges uncontrolled in the wilds of Africa. Buffon, indeed, and most writers previous to Cuvier, have applied the remarks of observers to both species indiscriminately, for it was not until they had been subjected to the penetrating scrutiny of the latter celebrated naturalist that their real specific difference was distinctly pointed out.

In this country it naturally happens, from our relations with the East Indies, that the elephant which is most commonly exhibited in menageries is of the Asiatic species. The two young individuals, which have been seen to such advantage during the past summer in the gardens of the Zoological Society, are of this kind. In the menagerie at the Jardin des Plantes, however, there is at present a fine young African elephant (*Elephas Africanus*, Cuv.), as well as a noble Asiatic one (*Elephas Indicus*, Cuv.). Hence the most ample opportunities have been afforded to the eminent naturalists who have the charge of that truly national establishment to determine accurately the sum and nature of their specific differences, and to furnish the world with figures of unquestionable fidelity, and executed under all the advantages of the present condition of the arts.

The head of the elephant of Africa is smaller, more elongated, and less irregular in its contour than that of the Asiatic species. The summit is rounded instead of being divided by a central longitudinal depression. But the most striking feature in the African elephant is the enormous size of his ears, which extend over his shoulders, and when agitated to and fro, beat the air with a violence and noise equal to that produced by the flapping of the wings of the condor or other huge bird. On the thick integument which invests the disproportionately small foot of the elephant five hoofs may be observed on the fore foot in both species, whilst on the hind foot four hoofs are observable in the Asiatic elephant, and three only in the African. We should be mistaken, however, in supposing that the number of toes strictly corresponded to these outward indications; for in both species, when the skin and flesh are removed and the bony framework is exposed, these huge productions of nature are seen to have been constructed on the same plan, and the ultimate divisions of all the four extremities are seen in the skeleton to be into five distinct parts or toes. It has been observed that the extremity of the proboscis in take our idea of its capacity from its outward appearance, we should be led to conceive very meanly of his abilities. The elephant, at first view, presents the spectator with an enormous mass of flesh that seems scarcely animated. Its huge body, covered with a callous hide without hair; its large misshapen legs that seem

the African elephant is better constructed as a prehensile organ, and that he seizes thin substances with greater ease and effect than his eastern relative. The tail in the African species is shorter by half its length than in the Asiatic. These characters are open to superficial inspection, and may be readily seized by the youngest student of zoology; but the most important specific distinction requires a closer investigation: it is derived from the differences presented by the worn-down surfaces of the grinding teeth;—those of the Asiatic elephant presenting parallel transverse wavy ridges, while the African's grinders are marked by transverse lozenge-shaped ridges. The degree of difference, therefore, between those two animals, when strictly considered with reference to the modern methods in zoology, is even greater than usually separates species such as the dog and wolf; and is equivalent rather to that which distinguishes the dog from the hyena. A distinct generic name (*Loxodonte*) has therefore been proposed for the African elephant.

The Asiatic elephant is generally seen under all the favourable circumstances that an association with man is calculated to produce. His wants being supplied, his passions moderated, and his intellectual powers developed by tuition, we find him elevated to the highest degree of perfection his nature can sustain: and in return he renders all his endowments subservient to the wants and luxuries of his master. But in the history of the elephant of Africa the scene is sadly reversed. In the wild regions which he traverses we find that, in his relations to mankind, mutual fear and deadly enmity usurp the place of services and benefactions. How often in the records of African travellers is the following picture presented! A tribe of Africans, of a mild and unwarlike disposition, cultivate a fertile spot on the banks of some large stream, and subsist on the produce of their rice-grounds, fields of maize, and plantations of sugar-cane. The time of harvest having arrived, they rejoice at the ample store of nutriment provided for their subsistence during the unproductive months. In a single night the hopes of a season are blighted. With rushing noise, and the earth trembling beneath their tread, a herd of wild and hungry elephants come suddenly upon the devoted settlement, attracted by the ripened vegetables. The poor negroes, surprised in sleep, and destitute of fire-arms, in vain attempt to oppose the progress of these formidable invaders. Their simple huts are overturned; and such as are unable to escape are beaten down with an irresistible blow of the proboscis, trodden under foot, or gored to death. The morning displays to the survivors the spot which had been occupied by their plantations converted into a wilderness and swamp; for the elephants tread down and destroy more than they consume. A famine succeeds, and pestilence, its usual concomitant; and the wretched remnant of the tribe are driven to the alternative of perishing through hunger, or of selling themselves as slaves to a more fortunate tribe.

But for occasional ravages of this description man takes ample vengeance, by the unceasing warfare waged against the offenders for the sake of their tusks. All the methods of capture practised against the elephant of Africa have his destruction for their end, his utility being confined to the ivory he furnishes for commerce; for the tusks of this species are very large, and of equal size both in the male and female. We are informed by Lander that the negroes inhabiting the banks of the Niger employ a very simple stratagem to insure the destruction of their ponderous and dreaded neighbour. In one of the beaten tracks by which the elephants pass down from the forests to bathe in the stream, a lance is fixed in the ground, pointing towards the part from which they issue: this being concealed by brushwood, penetrates the abdomen of the foremost elephant, who, feeling the smart, instead of retreating backwards, blindly rushes on with augmented speed, and thus is mortally wounded. In the neighbourhood of the Cape, and in other parts of the coast of Africa, where commercial settlements are situated, and fire-arms have been introduced, those weapons are commonly employed. This method of destruction requires great courage, patience, and capability of bearing fatigue, and is attended with considerable personal risk to the hunters. A third method, which requires still more address, consists in enticing the elephant to pursue a mounted hunter on the open plain, while the huge pursuer is hamstringed by a sabre cut inflicted by another hunter behind him. One might infer from the previous summary of the present condition of the African elephant, as relates to man, that his disposition was naturally vicious, and rendered him incapable of domestication. But there is no real ground for such a conclusion. Were the Africans raised to the same degrees of civilization as the Asiatic, there seems little doubt but that their species of elephant might be made equally useful in a state of servitude: for the specimen now living in the French National Menagerie has scarcely formed for motion; its little eyes, large ears, and long trunk—all give it an air of extreme stupidity. But our prejudices will soon subside when we come to examine its history: they will even serve to increase our surprise when we consider the various advantages it derives from so clumsy a conformation.

The elephant is seen from seven to no less than fifteen feet high.* Whatever care we take to imagine a large animal beforehand, yet the first sight of this huge creature never fails to strike us with astonishment, and in some measure to exceed our idea. Having been used to smaller animals, we have scarce any conception of its magnitude; for a moving column of flesh, fourteen feet high, is an object so utterly different from those we are constantly presented with, that to be conceived it must be actually seen.

Of all quadrupeds the elephant is the strongest as well as the largest; and yet, in a state of nature, it is neither fierce nor formidable (g) Mild, peaceful, and brave, it never abuses its power or its strength, and only uses its force for its own protection, or that of its community.†

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not shown less intelligence than the Asiatic elephant. It has learned the same tricks, and has performed the same motions and exercises, under the same circumstances, and in the same period of time. It is as affectionate to those who feed him, and as obedient to their commands. The Carthaginians, moreover, employed elephants for all the purposes that they have served in other parts of the civilized world; and they must have derived their supply from the species under consideration. Cuvier gives the following concise account of the ancient history of the elephant:—"Homer speaks frequently of ivory, but knew not the animal whence it was derived. The first of the Greeks who saw the elephant were Alexander and his soldiers, when they fought with Porus; and they must have observed them well, for Aristotle gives a complete history of this animal, and much truer in its details than those of our moderns. After the death of Alexander, Antigonus possessed the greatest number of elephants. Pyrrhus first brought them into Italy 472 years after the foundation of Rome: they were disembarked at Tarentum. The Romans, to whom these animals were entirely strange, gave them the name of Leucanian Bulls. Curius Dentatus, who captured four of these animals from Pyrrhus, brought them to Rome for the ceremony of his triumph. These were the first which were there exhibited, but afterwards they became in some measure common. Metellus having vanquished the Carthaginians in Sicily, conducted their elephants to Rome on rafts, to the number of a hundred and twenty, according to Seneca—of a hundred and forty-two, according to Pliny. Claudius Pulcher had combats of the elephant in the circus in 655; and similar combats, either of elephant against elephant, of the elephant against the rhinoceros, the bull, or the gladiator, were exhibited by Lucullus, Pompey, Cæsar, Claudius, and Nero. Pompey harnessed them to his car during his triumph for Africa. Germanicus exhibited some which danced in a rude fashion. In the reign of Nero they were seen to dance on a rope, carrying at the same time a Roman knight. One may read in Ælian the extraordinary feats they were brought to execute. It is true they were trained to them from their earliest age, and Ælian says even, expressly, that these dancing elephants were brought forth at Rome. This assertion, with the confirmation it has received in our own day from the experiments of Mr. Corse, leads us to hope it will be possible to multiply this useful animal in a state of domestication.

* Size.—The elephant rarely exceeds nine feet in height. The tallest ever found in Bengal was the *Pangul*, or Mad Elephant, well known about the year 1780: it measured nearly twelve feet at the shoulder, and was stout in proportion. The average of full-grown elephants may be estimated at from twelve to thirteen feet high.

† Account of a Fight between a Tiger and an Elephant.—In the midst of a grassy plain, about half a mile long and nearly as much in breadth, about sixty or seventy five elephants were drawn up in several ranks, each animal being provided with a mahawat and a hauda, which was empty. On one side were placed convenient seats; the governor, mandarins, and a numerous train of soldiers, being also present at the spectacle. A crowd of spectators occupied the side opposite. The tiger was bound to a stake placed in the centre of the plain, by means of a stout rope fastened round his loins. We soon perceived how unequal was the combat. The claws of the poor animal had been torn out, and a strong stitch bound the lips together, and prevented him from opening his mouth. On being turned loose from the cage, he attempted to bound over the plain; but, finding all attempts to

(g) I have extracted the greatest part of this description from Mr. Buffon. Where I add I mark with commas, "thus."

In their natural state, they delight to live along the sides of rivers, to keep in the deepest vales, to refresh themselves in the most shady forests and watery places. They cannot live far from the water; and they always disturb it before they drink. They often fill their trunk with it, either to cool that organ, or to divert themselves by spurting it out like a fountain. They are equally distressed by the extremes of heat and cold; and, to avoid the former, they frequently take shelter in the most obscure recesses of the forest, or often plunge into the water, and even swim from the continent into islands some leagues distant from the shore. Their chief food is of the vegetable kind, for they loathe all kind of animal diet. When one among their number happens to light upon a spot of good pasture, he calls the rest, and invites them to share in the entertainment; but it must be a very copious pasture indeed that can supply the necessities of the whole band. As with their broad and heavy feet they sink deep wherever they go, they destroy much more than they devour; so that they are frequently obliged to change their quarters, and to migrate from one country to another.

Such are the habits of this animal considered in a social light; and if we regard it as an individual, we shall find its powers still more extraordinary. With a very awkward appearance, it possesses all the senses in great perfection, and is capable of applying them to more useful purposes than any other quadruped. The elephant, as we observed, has very small eyes when compared to the enormous bulk of its body. But, though their minuteness may at first sight appear deformed, yet, when we come to examine them, they are seen to exhibit a variety of expression, and to discover the various sensations with which it is moved. It turns them with attention and friendship to its master; it seems to reflect and deliberate; and, as its passions slowly succeed each other, their various workings are distinctly seen.

The elephant is not less remarkable for the excellence of its hearing. Its ears are extremely large, and greater in proportion than even those of an ass. They are usually dependent; but it can readily raise and move them. They serve, also, to wipe its eyes, and to protect them against the dust and flies that might otherwise incommode them. It appears delighted with music, and very readily learns to beat time, to move in measure, and even to join its voice to the sound of the drum and the trumpet.

This animal's sense of smelling is not only exquisite, but it is in a great measure pleased with the same odours that delight mankind. The elephant gathers

extricate himself useless, he threw himself at length upon the grass, till, seeing a large elephant with long tusks approach, he got up and faced the coming danger. The elephant was by this attitude and the horrid growl of the tiger too much intimidated, and turned aside, while the tiger pursued him heavily, and struck him with his fore paw upon the hind quarter, quickening his pace not a little.

The mahawat succeeded in bringing the elephant to the charge again before he had gone far, and this time he rushed on furiously, driving his tusks into the earth under the tiger, and, lifting him up fairly, gave him a clear cast to the distance of about thirty feet. This was an interesting point in the combat. The tiger lay along on the ground as if he were dead, yet it appeared that he had sustained no material injury; for, on the next attack, he threw himself into an attitude of defence, and, as the elephant was again about to take him up, he sprung upon his forehead, fixing his hind feet upon the trunk of the former.

The elephant was wounded in this attack, and so much frightened, that nothing could prevent him from breaking through every obstacle, and fairly running off. The mahawat was considered to have failed in his duty, and soon after was brought up to the governor with his hands bound behind his back, and on the spot received a hundred lashes of the rattan.

Another elephant was now brought, but the tiger made less resistance on each successive attack. It was evident that the tosses he received must soon occasion his death.

All the elephants were furnished with tusks, and the mode of attack in every instance, for several others were called forward, was that of rushing upon the tiger, thrusting their tusks under him, raising him, and throwing him to a distance. Of their trunks they evidently were very careful, rolling them cautiously up under the chin. When the tiger was perfectly dead, an elephant was brought up, who, instead of raising the tiger in his tusks, seized him with his trunk, and in general cast him to the distance of thirty feet.—Arcana of Science for 1829.

flowers with great pleasure and attention: it picks them up one by one, unite them into a nosegay, and seems charmed with the perfume. The orange flowe seems to be particularly grateful both to its sense of taste and smelling: it strips the tree of all its verdure, and eats every part of it, even to the branches themselves. It seeks in the meadows the most odoriferous plants to feed upon; and in the woods it prefers the cocoa, the banana, the palm, and the sago tree, to all others. As the shoots of these are tender and filled with pith, it eats not only the leaves and the fruits, but even the branches, the trunk, and the whole plant to the very roots.

But it is in the sense of touching that this animal excels all others of the brute creation, and perhaps even man himself. The organ of this sense lies wholly in the trunk, which is an instrument peculiar to this animal, and that serves it for all the purposes of a hand. The trunk is, properly speaking, only the snout lengthened out to a great extent, hollow like a pipe, and ending in two openings, or nostrils, like those of a hog. An elephant of fourteen feet high has the trunk about eight feet long and five feet and a half in circumference at the mouth, where it is thickest. It is hollow all along, but with a partition running from one end of it to the other; so that though outwardly it appears like a single pipe, it is inwardly divided into two. This fleshy tube is composed of nerves and muscles, covered with a proper skin of a blackish colour, like that of the rest of the body. It is capable of being moved in every direction—of being lengthened and shortened, of being bent or straightened—so pliant as to embrace any body it is applied to, and yet so strong that nothing can be torn from the gripe. By means of this, the elephant can take a pin from the ground, untie the knots of a rope, unlock a door, and even write with a pen. It sometimes happens that the object is too large for the trunk to grasp; in such a case, the elephant makes use of another expedient as admirable as any of the former. It applies the extremity of the trunk to the surface of the object, and, sucking up its breath, lifts and sustains such a weight as the air in that case is capable of keeping suspended.* In this manner this instrument is useful in most of the purposes of life; it is an organ of smelling, of touching, and of suction; it not only provides for the animal's necessities and comforts, but it also serves for its ornament and defence.†

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* INSTINCT AND REASON.—As Mr. Jesse observes in his *Gleanings*, "It is impossible to define where instinct ends and reason begins in some animals;" for, from his observations on nature, his conviction is, that if our race has been pre-eminently distinguished by receiving the full light of reason, some sparks and glimmerings of the same divine faculty have been vouchsafed by the same forming and almighty hand to our inferior fellow-creatures:—

They also know,
And *reason* not contemptibly.—MILTON.

"I was one day," he says, "feeding the poor elephant (who was so barbarously put to death at Exeter 'Change) with potatoes, which he took out of my hand. One of them, a round one, fell on the floor, just out of the reach of his proboscis. He leaned against his wooden bar, put out his trunk, and could just touch the potato, but could not pick it up. After several ineffectual efforts, he at last blew the potato against the opposite wall with sufficient force to make it rebound, and he then, without difficulty, secured it. Now, it is quite clear, I think, that *instinct* never taught the elephant to procure his food in this manner: and it must, therefore, have been reason, or some intellectual faculty, which enabled him to be so good a judge of cause and effect. Indeed, the *reflecting* power of some animals is quite extraordinary. I had a dog who was much attached to me, and who, in consequence of his having been tied up on a Sunday morning to prevent his accompanying me to church, would conceal himself in good time on that day, and I was sure to find him either at the entrance of the church, or if he could get in, under the place where I usually sat.—GLEANINGS.

† ELEPHANT'S TRUNK.—The elephant invariably puts his trunk as far as possible out of danger. The trunk is extremely tender. The male seems to rely chiefly on its teeth. The trunk is the instrument by which it supplies itself with food, and, in cases of blindness, to save it from falling into danger. Captain Williamson says, speaking of a hog-chase, and the defence of the elephant,—"When elephants find hogs intent on getting under their bellies, with the intention to rip, they sometimes lay down with astonishing quickness; thereby not only protecting their intestines from injury, but often crushing the hog. I had once a little elephant which had been repeatedly charged by hogs, and used, when

But, though the elephant be thus admirably supplied by its trunk, yet, with respect to the rest of its conformation, it is unwieldy and helpless. The neck is so short that it can scarce turn the head, and must wheel round in order to discover an enemy from behind. The hunters that attack it upon that quarter generally thus escape the effects of its indignation, and find time to renew their assaults while the elephant is turning to face them. To the rest of the elephant's incumbrances may be added its enormous tusks, which are unserviceable for chewing, and are only weapons of defence. These, as the animal grows old, become so heavy that it is sometimes obliged to make holes in the walls of its stall to rest them in, and ease itself of the fatigue of their support. It is well known to what an amazing size these tusks grow: they are two in number, proceeding from the upper jaw, and are sometimes found above six feet long.

The hide of the elephant is as remarkable as any other part. It is not covered over with hair as in the generality of quadrupeds, but is nearly bare. Here and there indeed, a few bristles are seen growing in the scars and wrinkles of the body, and very thinly scattered over the rest of the skin; but in general the head is dry, rough, and wrinkled, and resembling more the bark of an old tree than the skin of an animal. This grows thicker every year, and by a constant addition of substance, it at length contracts that disorder well known by the name of the elephantiasis or Arabian leprosy; a disease to which man as well as the elephant, is often subject. In order to prevent this, the Indians rub the elephant with oil, and frequently bathe it to preserve its pliancy. To the inconveniences of this disorder is added another, arising from the great sensibility of those parts that are not callous. Upon these the flies settle in great abundance, and torment this animal unceasingly; to remedy which, the elephant tries all its arts; uses not only its tail and trunk in the natural manner to keep them off, but even takes the branch of a tree, or a bundle of hay, to strike them off with. When this fails, it often gathers up the dust with its trunk, and thus covers all the sensible places. In this manner it has been seen to dust itself several times a day, and particularly upon leaving the bath

Water is as necessary to this animal as food itself.* When in a state of

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ever she got one under her belly, to hustle it with all four legs—kicking it in such a manner as rarely failed to deprive it of the means of escape."

* Love of Water – Notwithstanding the massiveness of his frame, the elephant is not without a certain degree of lightness in his motions. He has a tolerably quick trot, and easily overtakes a man at full speed; but as he cannot turn rapidly, one may escape by turning suddenly to one side. Being specifically lighter than water, he easily swims; and his motions in that element are of the most free and lively description. Every one who enjoyed the sight of the elephant sporting in his bath at the Zoological Gardens during the summer of last year must acknowledge the gratification and surprise excited by the ease and variety of his actions. Notwithstanding, however, the liberal space allowed for his paddock and pond, our sagacious animal seemed not contented until he had rendered his domain still more analogous to the favourite haunts of his species in their native clime. This he effected by forming a miniature swamp in the immediate proximity of his pond, pumping up with his proboscis repeated quantities of water, and treading it into the soil, which thus was soon converted into a mud bath of a few feet in depth. In this he seemed peculiarly delighted, rubbing and rolling himself about, and expressing his gratification at the same time by uttering peculiar shrill guttural notes, and flapping his ears. In a state of nature this species prefers the banks of rivers, for heat as well as cold annoys him He is under a constant necessity of moistening his hard and rough skin, which otherwise is so apt to be excoriated; and he not only waters it, but throws over it dust, grass, straw, &c

Although this integument is so thick, it appears nevertheless to be extremely sensible, especially about the face, the legs, and the under part of the neck and body. We have sometimes seen the young elephant above mentioned, in the Society's menagerie, take a small branch in his trunk, and switch away the flies the moment they alighted on any of those parts — Zoological Magazine.

Soil. Diseases.—A removal from their native soil and climate is highly dangerous to elephants, subjecting them to a variety of acute diseases, the *ophthalmia* in particular. Elephants are natives of a cool soil, indeed of a wet one, and in their native state feed on watery aliments, and take great delight in ranging among swamps The feet of the elephant are from its birth habituated to a soft moist verdure nature, the elephant rarely quits the banks of the river, and often stands in water up to the belly. In a state of servitude, the Indians take equal care to provide a proper supply; they wash it with great address; they give it all the conveniences for lending assistance to itself; they smooth the skin with a pumice-stone, and then rub it over with oils, essences, and odours.

It is not to be wondered at that an animal furnished with so many various advantages, both of strength, sagacity, and obedience, should be taken into the service of man. We accordingly find that the elephant, from time immemorial, has been employed either for the purposes of labour, of war, or of ostentation; to increase the grandeur of eastern princes, or to extend their dominions. We have hitherto been describing this animal in its natural state; we now come to consider it in a different view, as taken from the forest and reduced to human obedience. We are now to behold this brave harmless creature as learning a lesson from mankind, and instructed by him in all the arts of war, massacre, and devastation. We are now to behold this half reasoning animal led into the field of battle, and wondering at those tumults and that madness which he is compelled to increase. The elephant is a native of Africa and Asia, being found neither in Europe nor America. In Africa he still retains his natural liberty. The savage inhabitants of that part of the world, instead of attempting to subdue this powerful creature to their necessities, are happy in being able to protect themselves from his fury. Formerly, indeed, during the splendour of the Carthaginian empire, elephants were used in their wars; but this was only a transitory gleam of human power in that part of the globe; the natives of Africa have long since degenerated, and the elephant is only known among them from his devastations. However, there are no elephants in the northern parts of Africa at present, there being none found on this side of Mount Atlas. It is beyond the river Senegal that they are to be met with in great numbers, and so down to the Cape of Good Hope, as well as in the heart of the country. In this extensive region they appear to be more numerous than in any other part of the world. But although these animals are most plentiful in Africa, it is only in Asia that the greatest elephants are found, and rendered subservient to human command.* In Africa, the largest do not exceed ten feet high; in Asia they are found from ten to fifteen. Their price increases in proportion to their size; and when they exceed a certain bulk, like jewels, their value then rises as the fancy is pleased to estimate. The largest are entirely kept for the service of princes; and are maintained with the utmost magnificence and at the greatest expense.

As the art of war is but very little improved in Asia, there are few princes of the East who do not procure and maintain as many elephants as they are able, and place great confidence on their assistance in an engagement. For this purpose, they are obliged to take them wild in their native forests; and tame them; for the elephant never breeds in a state of servitude. It is one of the most striking peculiarities in this extraordinary creature, that his generative powers totally fail when he comes under the dominion of man; as if he seemed unwilling to propagate a race of slaves to increase the pride of his conqueror. There is, perhaps, no other quadruped that will not breed in its own native climate, if indulged with a moderate share of freedom; and we know, that many of them will copulate in every climate. The elephant alone has never been seen to breed;(g) and though he has been reduced under the obedience of man for ages, the duration of pregnancy in the female still remains a secret.*

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* African Elephant.—Since 1681 no African elephant has been seen in Europe, until the young female figured by M. Cuvier, which is now alive in Paris, having been sent as a present by the Pacha of Egypt. Its habits, so far as those of a very young animal can be relied on, exhibit none of the ferocity usually ascribed to it, and are, indeed, fully as mild, intelligent, and tractable as those of the elephant of Asia.—Arcana of Science, 1828.

(g) Multis persuasum est Elephantem non brutorum sed hominum more coire. Quod retro mingit non dubitatur. Sed ipse vidi marem hujusce speciei, in nostri regis stabulis super fæmellam itidem inclusam quadrupedum more salientem, pene paululum incurvato, sed sufficienter recto.

The Indian princes having vainly endeavoured to multiply the breed of elephants, like that of other animals, have been, at last, content to separate the males from the females, to prevent those accesses of desire, which debilitated, without multiplying the species. In order to take them wild in the woods, a spot of ground is fixed upon, which is surrounded with a strong pallisade. This is made of the thickest and the strongest trees; and strengthened by cross bars which give firmness to the whole. The posts are fixed at such distances from each other, that a man can easily pass between them; there being only one great passage left open, through which an elephant can easily come; and which is so contrived as to shut behind, as soon as the beast is entered. To draw him into this inclosure, it is necessary first to find him out in the woods; and a female elephant is conducted along into the heart of the forest, where it is obliged by its keeper to cry out for the male.† The male very readily answers the cry, and hastens to join her; which the keeper perceiving, obliges her to retreat, still repeating the same cry, until she leads the animal into the inclosure already described, which shuts the moment he is entered. Still, however, the female proceeds calling, and inviting, while the male proceeds forward in the inclosure, which grows narrower all the way, and until the poor animal finds himself completely shut up, without the power of either advancing or retreating; the female, in the mean time, being let out by a private way, which she has been previously accustomed to. The wild elephant, upon seeing himself entraped in this manner, instantly attempts to use violence; and, upon seeing the hunters, all his former desires only turn to fury. In the mean time, the hunters, having fixed him with cords, attempt to soften his indignation, by throwing buckets of water upon him in great quantities, rubbing the body with leaves, and pouring oil down his ears. Soon after, two tame elephants are brought, a male and a female, that caress the indignant animal with their trunks; while they still continue pouring water to

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* Reproduction of the Elephant.— The obscurity which formerly prevailed respecting the mode of reproduction of the elephant has been dissipated in a great measure by the accurate and assiduous observations of our countryman, Mr. Corse. And it is a remarkable instance of the difficulty of eradicating a popular error or prejudice, that notwithstanding the circumstantial evidence and authentic description given by this gentleman relative to the above subject, it is still very generally believed that in a state of subjection the elephant is unalterably barren; and that though it has been reduced under the dominion of man for ages, yet, as if it had a proper sense of its degraded condition, it refuses to increase the pride and power of its conquerors by propagating a race of slaves. This circumstance was adduced by Buffon as one of the most striking instances of the superiority of the elephant, in its moral condition, over other quadrupeds. Mr. Corse, who resided for more than ten years at Tiperah, a province of Bengal, where herds of elephants are taken every season, and who for five years had the Company's elephant hunters entirely under his direction, has completely disproved these assertions. Twice during that period he succeeded in breeding from elephants in a state of captivity and servitude, and observes that this mode of supplying the Indian community with so useful an animal is abandoned only from its being more expensive than the ordinary method by the capture of the wild herds; since the elephants, after being reduced by the process of training, require rest and high feeding to bring them into the requisite condition. In this way was ascertained the precise period of gestation in the elephant, which Mr. Corse states to be twenty months and eighteen days. The young animal when born is 35½ inches high. It soon begins to nibble and suck the breast, pressing it with its trunk to make the milk flow more readily into its mouth while sucking. It has never been observed to use its proboscis in any other manner during this act, but invariably seized the nipple with the side of its mouth. At this period it is a common practice with the elephant attendants to raise a small mound of earth, about six or eight inches high, for the young one to stand on, and thus to save the mother the trouble of bending her body every time she gives suck; for she has never been observed to lie down for that purpose. The nipples are two in number, and are situated between the fore legs. It is remarkable that the elephant, although having but one young, has by no means a strong affection for it: instances have occurred of the mother leaving her offspring and escaping into the woods. If a wild elephant happens to be separated from her young for only two days, though giving suck, she never afterwards recognises or acknowledges it. "I have been much mortified," says Mr. Corse, "at such unnatural conduct, particularly when it was evident the young elephant knew its dam, and by its plaintive cries and submissive approaches solicited her assistance." During the first year the elephant grows eleven inches, and is three feet eleven inches high; in the second he grows eight inches; in the third six; in the fourth year five inches; about the same in the fifth year; in the sixth year three inches and a half; and in the seventh year two inches and a half,—measuring then six feet four inches in height. During the succeeding ten years the growth is comparatively slow. The male is longer in attaining his full growth than the female, seldom having acquired it before his twenty-sixth year.—Zoological Magazine.

† Decoy Elephants.—The method of decoying elephants is the most singular exhibition of sagacity which occurs in the whole animal kingdom. The *Koomkie* or female elephant employed becomes an active accessary in a plot against her fellow-creature, discovering not only great readiness, but much ingenuity and anxiety for the success of the enterprise, as well as for the per-

sonal safety of her keeper. At the season of procreation, domestic animals, and likewise those in a wild state are very fierce and warlike. In the large flocks of elephants, dreadful conflicts take place, terminating in the expulsion of the weaker parties: the master elephant of the herd wages war on the *sauns*, or single males, who from their equality of stature become objects of jealousy. Full of passion and resentment, many of these destroy every thing within their power, pulling up sugar-canes, plantain-trees, and all in the most wanton manner; then in a sulky state they seek the heavy covers, where time allays their passions, and by degrees they join their own, or some other herd. These single males very soon attract the notice of the dealer, and one or two koomkies are dispatched for the purpose of securing such substantial prizes. Each *mohout* is provided with a black blanket, and a small quantity of strong rope, proper for securing the *saun*. Covered with his blankets, the mohout crouches on the back of the koomkie; and if the situation be favourable, both the *koomkie* and driver furnish themselves with green boughs, which the former carries in her trunk, playing with it in such a manner as to favour the concealment of the latter. A most singular scene now presents itself: the *koomkies* begin to caress the *saun*, raising his passions by the most amatory demeanour; during which the mohouts approach, and pass ropes with wonderful dexterity round the fore and hind legs of the *saun*, which being elated, loses all sense but that of animal enjoyment, and is speedily secured. During the operation, the conduct of the *koomkies* is peculiarly artful. They not only exert themselves with astonishing address to divert the attention of the *saun*, and to cut off his view downwards by means of their trunks, but they even aid in effecting the ligatures therewith, passing the rope at times when the mohouts might either be exposed to danger, or unable to reach it. Of the sagacity, wantonness, and cunning of the female elephant, Captain Williamson gives illustration in the following anecdote. "A gentleman bought a female elephant at the sale of a deceased person's effects, not having the least idea that she was a *koomkie*, which to him would not have been any recommendation, as he was not a dealer in that branch. He resided for a short time at the place of sale, and repeatedly refused handsome offers for his late purchase; to obtain which many persons seemed desirous, but finding him ignorant of her qualifications, all carefully kept secret on the subject, lest a knowledge of them might cause him to overrate an animal that each hoped at some time to obtain. The *mohout*, or animal's keeper, equally anxious to get out of employment replete with danger, yet desirous of being in the service of the gentleman, forbore to reveal the value of the elephant to his master. One morning *Lutchmee Pearree*, which was the elephant's name, was not to be found; for several days no intelligence could be obtained respecting the truant; and in fact she was given over for lost, under the supposition that she had strayed into the neighbouring jungles, and joined with the wild herds: thus no prospect of recovering her. About a week after, *Lutchmee* made her appearance at her pickets, and being secured, was accoutred, and her master mounted her to take a ride. He happened to proceed to the skirt of a very heavy grass jungle, into which *Lutchmee* frequently attempted to turn, but was prevented by the *mohout*, who suspected that she was become wild, and might prove dangerous. At length *Lutchmee* became quite restive, and in defiance of control dashed into the jungle; nor did she stop, until arriving at a thick patch of trees, to the utter astonishment of her terrified burden, a large male was discovered, round whose fore legs the iron chain with which *Lutchmee* was ordinarily fastened during the night at her pickets, was turned, so as to secure her prize in the most complete manner!"—ORIENTAL FIELD SPORTS, *abridged*.

refresh it. At last a tame elephant is brought forward, of that number which is employed in instructing the new comers, and an officer riding upon it, in order to show the late captive that it has nothing to fear. The hunters then open the inclosure; and while this creature leads the captive along, two more are joined on either side of it, and these compel it to submit. It is then tied by cords to a massy pillar provided for that purpose, and suffered to remain in that position for about a day and a night, until its indignation be wholly subsided. The next day it begins to be somewhat submissive; and, in a fortnight, is completely tamed like the rest. The females are taken when accompanying the males; they often come into these inclosures, and they shortly after serve as decoys to the rest. But this method of taking the elephant differs according to the abilities of the hunter; the negroes of Africa, who hunt this animal merely for its flesh, are content to take it in pitfalls; and often to pursue it in the defiles of a mountain, where it cannot easily turn, and so wound it from behind till it falls.*

The elephant, when once tamed, becomes the most gentle and obedient of all animals. It soon conceives an attachment for the person that attends it, caresses him, obeys him, and seems to anticipate his desires. This acquaintance is often perfectly necessary; for the elephant frequently takes such an affection for its keeper that it will obey no other: and it has been known to die for grief, when in some sudden fit of madness, it has killed its conductor. We are told, that one of these, that was used by the French forces in India for the drawing their cannon, was promised, by the conductor, a reward, for having performed some painful service; but being disappointed of its expectations, it slew him in a fury. The conductor's wife, who was a spectator of this shocking scene, could not restrain her madness and despair; but running with her two children in her arms, threw them at the elephant's feet, crying out that since it had killed her husband, it might kill her and her children also. The elephant, seeing the children at its feet, instantly stopped, and moderating its fury, took up the eldest with its trunk, and placing him upon its neck, adopted him for its conductor, and obeyed him ever after with great punctuality.

In India, where they were at one time employed in launching ships, a particular elephant was directed to force a very large vessel into the water: the work proved superior to its strength, but not to its endeavours; which, however, the keeper affected to despise. "Take away," says he, "that lazy beast, and bring another better fitted for service." The poor animal instantly upon this redoubled its efforts, fractured its scull, and died upon the spot.

In Delhi, an elephant, passing along the streets, put his trunk into a tailor's shop, where several people were at work. One of the persons of the shop, desirous of some amusement, pricked the animal's trunk with his needle, and seemed highly delighted with this slight punishment. The elephant, however, passed on without any immediate signs of resentment; but coming to a puddle filled with dirty water, he filled his trunk, returned to the shop, and spurted the contents over all the finery upon which the tailors were then employed.†

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* Capturing in Pit-falls.—Another method of catching wild elephants is by decoying them by means of a tame animal to pits, covered with grass and rushes, into which they are precipitated. These traps are also made in those paths much frequented by elephants, which in their nightly rambles occasionally stumble into them, and by their moanings, quickly convey intelligence of the success of the device to the peasant. The mode of getting elephants out of pits is somewhat curious, but extremely simple. The animal is for the most part retained until sufficiently tractable to be conducted forth, when large bundles of jungle grass tied up into sheaves being thrown to him, he is gradually brought to the surface, as may enable him to step out. A very strong objection exists against elephants taken in pits; they are generally lamed, notwithstanding the soft substances, such as leaves and grass, laid at the bottom; exclusive of which, internal bruises often take place, extremely injurious to the constitution of the animal.—Oriental Field Sports, *abridged*.

† Resentment.—Though elephants are somewhat resentful, they are by no means cruel. Instances have happened of their displaying much magnanimity; the following may serve as a proof A boy of about nine

An elephant in Adsmeer, which often passed through the bazar or market, as he went by a certain herb-woman, always received from her a mouthful of greens. Being one day seized with a periodical fit of madness, he broke his fetters, and, running through the market, put the crowd to flight; and, among others, this woman, who in her haste forgot a little child at her stall. The elephant recollecting the spot where his benefactress was accustomed to sit, took up the infant gently in his trunk, and conveyed it to a place of safety.

At the Cape of Good Hope it is customary to hunt those animals for the sake of their teeth. Three horsemen, well mounted, and armed with lances, attack the elephant alternately, each relieving the other, as they see their companion pressed, till the beast is subdued. Three Dutchmen, brothers, who had made large fortunes by this business, determined to retire to Europe, and enjoy the fruits of their labours; but they resolved one day before they went, to have a last chase, by way of amusement: they met with their game, and began their attack in the usual manner; but, unfortunately, one of their horses falling, happened to fling his rider; the enraged elephant instantly seized the unhappy huntsman with his trunk, flung him up to a vast height in the air, and received him upon one of his tusks as he fell; and then turning towards the other two brothers, as if it were with an aspect of revenge and insult, held out to them the impaled wretch, writhing in the agonies of death.*

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years old, son to a *mohout*, used in his father's absence to teaze the elephant, which for a long time put up with all his mischievous tricks. One day, however, being extremely provoked, she seized the young rogue by the middle with her trunk, and curling it inwards with the boy in its centre, but without pressure, she drew him gently against her two teeth which proceed from the upper jaw, and in females are very short. Thus she held him: the boy was so alarmed that he could not call for assistance. She, however, saved him that trouble by commencing a hideous roar, which summoned the father, on whose arrival she unfolded her trunk.

* ELEPHANT HUNT.—The country we were traversing was singularly varied,—savage nature unreclaimed,—no blue smoke amidst the dark green hills and shadowy hollows told of an habitation. even the roads are the work of an elephant. Man has never appeared in these tremendous solitudes, save as a destroyer. All was still, yet at intervals there came upon the ear the distant sound of a passing bell, heavy and slow like a death-toll; all again was still, and again the bell-bird's note came borne on the wind: we never seemed to approach it, but that slow, melancholy, distant, dream-like sound still continued at intervals to haunt us like an evil omen. We threaded the elephants' paths with a swift silent pace, over hills and through ravines, until, from having been unaccustomed to walking in this riding country, I began, greatly to the surprise of the hunter, to show symptoms of fatigue. "We shall soon be among the elephants," he said, "and then we can sit down and watch them" Forward we went, now in shadow and now in light, as we wound through the high bush; the light now glancing on the strange head-gear of the leading Hottentot, now touching the yellow handkerchief that bound the hunter's head. We had frequently traced the mighty foot-prints of the elephant; from which the Hottentots told us when the animals had been there. "This is three days old."—"This is last night." It was curious to observe the marks stamped in the mud around the small ponds, of animals that left their haunts at night to drink. The misshapen *spoor* of the elephant; that of the rhinoceros, resembling three horses' hoofs; the buffalo, the wolf, the timid and various antelopes, and the baboon, were all clearly traced. The search was becoming hopeless, when the leader pointed to a distant hill; there was a consultation in which it was decided that a troop of elephants was passing over it. I looked, and could see nothing. But now we went on with fresh vigour, and gained the hill opposite to that on which they were; we halted and watched, and a few words passed between the hunter and skipper, and we descended silently the ravine that divided us Again they whispered, marked from what point the light breeze came, and we commenced the steep ascent in a direction that the wind might come from the animals to us; for we were now so near them that their quick scent would have discovered us. Skipper led, while we followed in Indian files, threading a narrow rocky path, which skirted one bank of a small hollow, while the huge beasts were feeding on the opposite one. The leader halted, the hunter gave my companions and myself light sticks, and whispered directions to fire the bush and grass, and to retreat, in the event of the animals charging. It was a strange feeling to find myself within twenty yards of creatures whose forward movement would have been destruction; but they stood browsing on the bushes, and flapping their large

The teeth of the elephant are what produces the great enmity between him and mankind; but whether they are shed, like the horns of the deer, or whether the animal be killed to obtain them, is not yet perfectly known. All we have as yet certain is, that the natives of Africa, from whence almost all our ivory comes, assure us, that they find the greatest part of it in their forests; nor would, say they, the teeth of an elephant recompense them for their trouble and danger in killing it: notwithstanding, the elephants which are tamed by man, are never known to shed their tusks; and from the hardness of their substance, they seem no ways analogous to deer's horns.*

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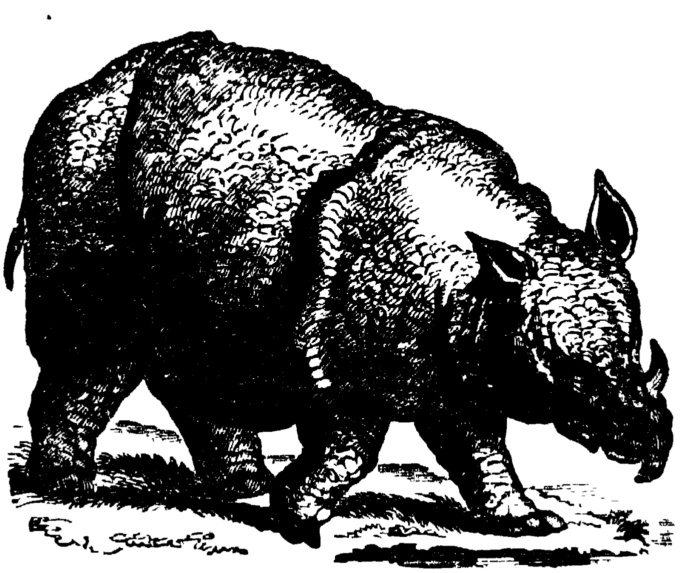
ears, pictures of indolent security. We were taking our stations when we heard a shot, and then another; and of the eight elephants, seven fled. We went forward to see the effects of the shots. Skipper's had carried death with it; the elephant had fallen, but rose again. I never heard any thing like its groans; he again fell, and we went up to him; the ball had entered behind the shoulder, and pierced the heart.—Rose's Southern Africa.

Gallantry of the Elephant.—On one occasion a band of hunters had surprised two elephants, a male and a female, in an open spot, near the skirts of a thick and thorny jungle. The animals fled towards the thickets; and the male, in spite of many balls which struck him ineffectually, was soon safe from the reach of the pursuers; but the female was so sorely wounded that she was unable to retreat with the same alacrity, and the hunters having got between her and the wood, were preparing speedily to finish her career, when all at once the male rushed forth with the utmost fury from his hiding place, and with a shrill and frightful scream, like the loud sound of a trumpet, charged down the huntsmen. So terrific was the animal's aspect, that all instinctively sprung to their horses, and for their lives. The elephant, disregarding the others, singled out an unfortunate man, Cobus Klopper, who was the last person that had fired upon its comrade, and who was standing with his horse's bridle over his arm, reloading his huge gun, at the moment when the infuriated animal burst from the wood. Cobus also leaped hastily on horseback, but before he could seat himself in his saddle, the elephant was upon him. One blow from his proboscis struck poor Cobus to the earth, and without troubling himself about the horse, he thrust his gigantic tusks through the man's body, and then after stamping it flat with his ponderous feet, again seized it with his trunk, and flung it high into the air. Having thus wreaked vengeance upon his foes, he walked gently up to his consort, and affectionately caressing her, supported her wounded side with his shoulder, and regardless of the volley of balls, with which the hunters, who had again rallied to the conflict, assailed him, he succeeded in conveying her from their reach into the impenetrable recesses of the forest.

* Mademoiselle D'Jeck.—The inhabitant of this country recently witnessed the dramatic exhibition of an elephant, which afforded them a more remarkable example of the sagacity of this quadruped than the ordinary docility which it manifests at the command of the showman. This elephant was a large female from Siam, and was exhibited in the Adelphi Theatre, London, and throughout the country. She was taken in 1830 to America. She was well disciplined, and exhibited her feats with considerable effect, by their adaptation to scenic display. To march in a procession, to kneel down without any more perceptible bidding than the waving of a hand, to salute a particular individual, to place a crown upon the head of the "true prince," to eat and drink with great gravity and propriety of demeanour, and to make her reverence to an audience without any apparent signal, are very striking evidences of the tractability of this creature; but they are by no means of the class of novel exhibitions, and they have been excelled by other performances of which we have a distinct record. One of the most remarkable narratives of the ancient display of elephants in a theatre, is that of Ælian, who has described in a very lively manner the extreme docility of the elephants of Germanicus. At that period, elephants were *bred* at Rome—a fact which has been most unaccountably overlooked in the description of modern naturalists, but the practicability of which has received abundant confirmation from recent experience.

CHAP. XXIII.

THE RHINOCEROS.



Next to the elephant, the Rhinoceros is the most powerful of animals.[*] It is usually found twelve feet long, from the tip of the nose to the insertion of the tail; from six to seven feet high; and the circumference of its body is nearly equal to its length. It is, therefore, equal to the elephant in bulk; and if it appears much smaller to the eye, the reason is, that its legs are much shorter. Words can convey but a very confused idea of this animal's shape; and yet there are few so remarkably formed: its head is furnished with a horn, growing from the snout, sometimes three feet and a half long: and but for this that part would have the appearance of the head of a hog; the upper lip, however, is much longer in proportion, ends in a point, is very pliable, serves to collect its food, and deliver it into the mouth; the ears are large, erect, and pointed; the eyes are small and piercing; the skin is naked, rough, knotty, and lying upon the body in folds, after a very peculiar fashion: there are two folds very remarkable; one above his shoulders, and another over the rump:

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[*] History of the Rhinoceros.—If the moderns are able to boast of a more extended knowledge of animated nature than was possessed by the ancients, it must be acknowledged that it is rather the result of their geographical discoveries, than of the zeal of their governments or commercial companies for its promotion. And it is humiliating to think that the nations, among which a pure love of science is most widely diffused, still should be debarred the contemplation of those rarer species of quadrupeds inhabiting the Old World, which in ancient Rome were repeatedly exhibited to gratify a tyrant's love of ostentation, and a people's lust for the cruel combats and wholesale slaughter of the Amphitheatre.

The history of the remarkable quadruped with which the present work commences (the Giraffe) in some measure exemplifies this anomalous fact, and the rhinoceros is a still stronger proof of it. This quadruped, which is second in bulk to the elephant alone, is peculiar to the Old World; yet of the five or six distinct species which inhabit Africa and Asia, only one has been exhibited in modern Europe, and that at rare and distant intervals; while the knowledge of the rest has been chiefly acquired in our own times.

The first rhinoceros of which any mention is made in ancient history, was that which appeared at the celebrated festival of Ptolemæus Philadelphus, and which was made to march the last of all the strange animals exhibited at that epoch, as being apparently the most curious and rare. It was brought from Ethiopia.

The first which appeared in Europe graced the triumph and games of Pompey. Pliny states that this animal had but one horn, and that that number was the most common.

Augustus caused two to be slain, together with a hippopotamus, when he triumphed after the death of Cleopatra: and these, also, are described as having each but one horn.

Strabo very exactly describes a one-horned rhinoceros, which he saw at Alexandria, and mentions the folds in its skin. But Pausanias gives a detailed account of the position of the two horns, on a species having that number, which he terms the Ethiopian Bull.

Of this latter kind two appeared at Rome under Domitian, and were engraved on some of the medals of that emperor; these occasioned some of the epigrams of Martial, which modern commentators, from ignorance of the species with two horns, found so much difficulty in comprehending.

The emperors Antoninus, Heliogabalus, and Gordian, severally exhibited the rhinoceros: and Cosmus expressly speaks of the Ethiopian species as having two horns: there is abundant evidence, therefore, that the ancients possessed a degree of knowledge respecting these animals, of which the moderns were for a long period destitute.

The first rhinoceros which was exhibited in Europe after the revival of literature, was a specimen of the one-horned species. It was sent from India to Emmanuel, king of Portugal, in the year 1513. This sovereign made a present of it to the Pope; but the animal being seized during its passage with a fit of fury, occasioned the loss of the vessel in which it was transported. A second rhinoceros was brought to England in 1685; a third was exhibited over almost the whole of Europe in 1739; and a fourth, which was a female, in 1741. That exhibited in 1739 was described and figured by Parsons, in the Philosophical Transactions (vol xlii p. 583), who mentioned also that of 1685 and of 1741. A fifth specimen arrived at Versailles in 1771, and it died in 1793 at the age of twenty-five or twenty-six years. The sixth was a very young rhinoceros, which died in this country in the year 1800: some account of its anatomy was published by Mr. Thomas, in the Philosophical Transactions for that year. Lastly, a seventh specimen was living a few years ago in the Garden of Plants at Paris. All these specimens were one-horned, and all from India. So that the two-horned rhinoceros has never been brought alive to modern Europe, and it was long before even an accurate description of it was given by travellers; its existence was known only by specimens of the horns adhering to the skin of the head, which were preserved in different museums. As these specimens were from Africa, and as the first authentic accounts of the living animal of the two-horned species were derived from the histories of African travellers, a general notion prevailed that Asia afforded the one-horned species only, and that the two-horned kind was peculiar to Africa. However, in the year 1793, Mr. William Bell, a surgeon in the service of the East India Company, discovered a species of rhinoceros in the Island of Sumatra, which had also two horns, whose skin, like the African two-horned species, did not exhibit those folds which are so peculiar to the hide of the Indian rhinoceros. This species, however, differed from the African rhinoceros in possessing incisive or front teeth, which in the latter are wholly deficient. The Abyssinian traveller Bruce has given a vague indication of a two-horned rhinoceros, which exhibits the plaiting of the hide peculiar to the Indian species; and some naturalists have supposed it probable, from the form of the horns, that this may ultimately be found to be a true and distinct species. More recently, again, the accurate and scientific traveller Burchell has announced the existence in the interior of the southern promontory of Africa, of a rhinoceros double the size of the ordinary Cape species, which, like it, has also two horns, and a skin without hairs or folds, but which differs in having the lips and nose thickened, enlarged, and as if flattened.

An interesting memoir from the pen of M. Frederic Cuvier, has appeared in the splendid work published by him conjointly with M. Geoffroy St. Hilaire, on the animals in the menagerie in the Garden of Plants at Paris. It relates to the rhinoceros lately living in that establishment, and from which the figure was taken which serves to illustrate the present account.—Zoological Mag.

"This rhinoceros was but young at the time that the figure was taken; and, contrary to the commonly received opinion, was habitually of a very gentle disposition, obedient to his keeper, and receiving his care and attention with a real affection. However, he would occasionally be seized with fits of fury, during which it was not prudent to come near him. No cause could be assigned for these violent paroxysms: one might say that a blind impulse or desire to regain a state of liberty, (which he had never enjoyed,) excited him to break his chains, and escape from the bondage in which he was retained. Bread and fruits, however, always pacified him; and the claims of hunger always silenced those of liberty; so that this resource against his fury was always kept in reserve. He knew those persons who most indulged him in his *gourmandise*, and they were received with the liveliest manifestations of affection: the moment he saw them he stretched towards them his long upper lip, opened his mouth, and drew in his tongue. The narrow stall in which he was confined did not allow him to manifest much intelligence; and his keeper took no other pains than to induce him to forget or misconceive his own strength, and to obey: but from the attention which he paid to every thing which was passing around him, and from the readiness with which he distinguished individuals the skin, which is of a dirty brown colour, is so thick as to turn the edge of a scimitar, and to resist a musket-ball: the belly hangs low; the legs are short, strong and thick, and the hoofs divided into three parts, each pointing forward.

Such is the general outline of an animal that appears chiefly formidable from the horn growing from its snout; and formed rather for war, than with a propensity to engage. This horn is sometimes found from three to three feet and a half long, growing from the solid bone, and so disposed as to be managed to the greatest advantage.* It is composed of the most solid substance; and

and recognised those circumstances which seemed the preliminaries of his receiving something agreeable to him, one can readily judge that his intelligence would have acquired greater developement under favourable circumstances. But his immense force, and the apprehensions constantly entertained that in one of his fits of passion he would break down his apartment, insured for him the most indulgent treatment; nothing was required of him without a reward; and the little degree of motion which was allowed him, was an additional reason for requiring from him no other actions than to open his mouth, turn his head to the right or to the left, hold up his leg, &c."—Zoological Mag.

Tractability of the Rhinoceros.—The learned Bishop Heber confirms the supposition of Frederic Cuvier, as to the tractability of the rhinoceros. In his journey through India, he observes: "At Lucknow there were five or six very large rhinoceroses, the first animals of the kind I ever saw, and of which I found that prints and drawings had given me a very imperfect conception. They are more bulky animals, and of a darker colour than I had supposed, and the thickness of the folds of their impenetrable skin much surpasses all which I had expected. These at Lucknow are quiet and gentle animals, except that one of them has a feud with horses. They seem to propagate in captivity without reluctance, and I should conceive might be available to carry burthens as well as the elephant, except that as their pace is still slower than his, their use could only be applicable to very great weights, and very gentle travelling. These have sometimes had howdahs on them, and were once fastened in a carriage, but only as an experiment, which was never followed up."—vol. ii.

And in the third volume he observes: "In passing through the city I saw two very fine hunting tigers in silver chains; and a rhinoceros, (the present of Lord Amherst to the Guicwar,) which is so tame as to be ridden by a mohout quite as patiently as an elephant."

The able translator of Cuvier's Animal Kingdom observes: "The power of this species is frequently displayed to a surprising degree when hunting it. A few years ago, a party of Europeans with their native attendants and elephants, when out on the dangerous sport of hunting these animals, met with a herd of seven of them, led, as it appeared, by one larger and stronger than the rest. When the large rhinoceros charged the hunters, the leading elephants, instead of using their tusks or weapeons, which in ordinary cases they are ready enough to do, wheeled round, and received the blow of the rhinoceros's horn upon their posteriors; the blow brought them immediately to the ground with their riders; and as soon as they had risen, the brute was again ready, and again brought them down; and in this manner did the contest continue until four out of the seven were killed, when the rest made good their retreat.

"By comparing the tenor of these short observations of them in their wild condition and in a state of confinement, we may gather sufficient data on which to form a tolerable estimate of the character of these animals. Endowed with amazing powers of body,—powers which can repel, if not overcome the active ferocity of the lion and the ponderous strength of the elephant, but at the same time seeking their sustenance not by the destruction of animal life, but in the profuse banquet of the vegetable kingdom, they might naturally be expected to avail themselves of their physical power principally in self-defence. Accordingly we find that to the first aggressor the rhinoceros is a terrible enemy; but if left to the ordinary bent of his own inclination, if unmolested, in short, he does not wantonly seek occasion to exercise his strength to the injury of other creatures."—Zoological Magazine.

* The Unicorn.—There is every reason to believe that the graceful Unicorn of heraldry had no other foundation in truth, than the uncertain description given by early travellers, of the clumsy figure of the above animal. Mr. Edward Ruppell, who has resided during six successive years in the north-eastern regions of Africa, has published several numbers of a work illustrative of the natural history of these regions. To our knowledge of the giraffe he has added considerably. He obtained in Nubia and Kordofan five specimens, two of which were males and three females. He regards the horns as constituting the principal generic character, they being formed by distinct bones, united to the frontal and parietal bones, by a very obvious suture, and having

pointed so as to inflict the most fatal wounds. The elephant, the boar, or the buffalo, are obliged to strike transversely with their weapons; but the rhinoceros employs all his force with every blow; so that the tiger will more willingly attack any other animal of the forest than one whose strength is so justly employed. Indeed, there is no force which this terrible animal has to apprehend: defended, on every side, by a thick horny hide, which the claws of the lion or the tiger are unable to pierce, and armed before with a weapon that even the elephant does not choose to oppose.

But though the rhinoceros is thus formidable by nature, yet imagination has not failed to exert itself in adding to its terrors. The scent is said to be most exquisite; and it is affirmed that it consorts with the tiger. It is reported, also, that, when it has overturned a man, or any other animal, it continues to lick the flesh quite from the bone with its tongue, which is said to be extremely rough. All this, however, is fabulous: the scent, if we may judge from the expansion of the olfactory nerves, is not greater than that of a hog, which we know to be indifferent; it keeps company with the tiger only because they both frequent watery

throughout the same structure with the other bones. In both sexes one of these abnormal bones is situated on each branch of the coronal suture, and the male possesses an additional one placed more anteriorly, and occupying the middle of the frontal suture. The anomalous position of this appendage furnishes a complete refutation of the theory of Camper with regard to the unicorn, that such an occurrence was contrary to nature, and proves at least the possibility of the existence of such an animal. Mr. Ruppell also obtained some information in Kordofan respecting this much debated animal. It was stated to be of the size of a small horse, of the slender make of the gazelle, and furnished with a long, straight, slender horn in the male, which was wanting in the female. According to the statements made by various persons, it inhabits the deserts to the south of Kordofan, is uncommonly fleet, and comes only occasionally to the Koldagi Heive Mountain or the borders of Kordofan — Edinburgh New Philosophical Journal.

Account of the Chiru, or Unicorn of the Himalayah Mountains.—Mr. Hodgson's paper on the *Chiru* concerned the animal which has been so often mentioned as the unicorn of the Himalayah. The reports respecting this animal have been so numerous and concurring, and so borne out by the specimens of single horns sent down at various times to the Asiatic Society, and by Bhotea drawings of a deer-like animal with one horn springing from the centre of the forehead, that scepticism has been almost silenced by the variety and quantity of evidence. The skin and horns sent by Mr. Hodgson were the spoils of an animal which lived in the menagerie of the Rajah of Nepal, to whom it was presented by the Lama of Diurchi, whose pet it had been. The person who brought the animal to Nepal informed Mr. Hodgson that the favourite abode of the Chiru is the Tingri Maidan, a fine plain or valley through which the Arun flows, and which is situated immediately beyond the snows of the Kooti pass; that in this valley beds of salt abound, to which the *Chirus* are said to resort in vast herds. They are represented as in the highest degree wild, and unapproachable by man, flying on the least alarm; but if opposed, assuming a bold and determined front. The male and female are said to present the same general appearance.

The living subject of Mr. Hodgson's description presented none of those formidable attributes with which the tales of the Bhoteas had clothed the *Chiru*. In form and size he offered the common character of the antelope tribe, lived chiefly on grass, and did not seem dissatisfied with his captivity, although his panting showed that even the climate of Nepal was oppressive to him; he at length sunk under a temperature which rarely exceeded 80° as a maximum at the commencement of the hot weather. Although timid, and on his guard against the approach of strangers, he would, when warily laid hold of, submit patiently to handling.

The general form of the animal was graceful, like that of other antelopes, and was adorned with their matchless eye. His colour was reddish or fawn on the upper, and white on the lower part of the body. His distinguishing characters were, first, long, sharp, black horns, having a wavy, triple curvature, with circular rings towards their base, which projected more before than behind; and, secondly, two tufts of hair projecting on the outer side of each nostril, together with an unusual quantity of bristles about the nose and mouth, and which gave to his head a somewhat thickened appearance. The hair of the animal resembled in texture that of all the trans-Himalayah animals which Mr. Hodgson has had the opportunity of examining, being harsh and of a hollow appearance. "It was about two inches long, and so thick as to present to the hand a sense of solidity; and beneath lay a spare fleece of the softest wool."—Arcana of Science, 1828.

places in the burning climates where they are bred; and as to its rough tongue, that is so far from the truth that no animal of near its size has so soft a one. "I have often felt it myself," says Ladvocat, in his description of this animal; "it is smooth, soft, and small, like that of a dog, and to the feel it appears as if one passed the hand over velvet. I have often seen it lick a young man's face who kept it, and both seemed pleased with the action."

The age of these animals is not well known. It is said by some that they bring forth at three years old; and, if we may reason from analogy, it is probable they seldom live till above twenty. That which was shown in London was said, by its keeper, to be eighteen years old, and even at that age he pretended to consider it as a young one: however, it died shortly after, and that probably in the course of nature.

The rhinoceros is a native of the deserts of Asia and Africa, and is usually found in those extensive forests that are frequented by the elephant and the lion. As it subsists entirely upon vegetable food, it is peaceful and harmless among its fellows of the brute creation; but, though it never provokes to combat, it equally disdains to fly. It is every way fitted for war, but rests content in the consciousness of its security. It is particularly fond of the prickly branches of trees, and is seen to feed upon such thorny shrubs as would be dangerous to other animals either to gather or to swallow. The prickly points of these, however, may only serve to give a poignant relish to this animal's palate, and may answer the same grateful ends in seasoning its banquet that spices do in heightening ours.

In some parts of the kingdom of Asia, where the natives are more desirous of appearing warlike than showing themselves brave, these animals are tamed, and led into the field to strike terror into the enemy; but they are always an unmanageable and restive animal, and probably more dangerous to the employers than those whom they are brought to oppose.

The method of taking them is, chiefly, watching them till they are found either in some moist or marshy place, where, like hogs, they are fond of sleeping and wallowing. They then destroy the old one with fire-arms; for no weapons that are thrown by the force of man are capable of entering this animal's hide. If, when the old one is destroyed, there happens to be a cub, they seize and tame it. These animals are sometimes taken in pitfalls, covered with green branches, laid in those paths which the rhinoceros makes in going from the forest to the river side.

There are some varieties in this animal as in most others. Some of them are found in Africa with a double horn, one growing above the other: this weapon, if considered in itself, is one of the strongest and most dangerous that Nature furnishes to any part of the animal creation. The horn is entirely solid, formed of the hardest bony substance, growing from the upper maxillary bone by so strong an apophyse as seemingly to make but one part with it. Many are the medicinal virtues that are ascribed to this horn when taken in powder; but these qualities have been attributed to it without any real foundation, and make only a small part of the many fables which this extraordinary animal has given rise to.*

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* **Enmity against the Elephant.**—The rhinoceros and male elephant have been discovered both dead—the elephant's bowels being ripped open, and the rhinoceros transfixed under the ribs by one of the elephant's teeth. These combats are, however, very rarely seen. Major Lally, in one of his hunting parties, as mentioned in the Oriental Field Sports, having arrived at the summit of a low range of hills, was suddenly presented with a distinct view of a most desperate engagement between a rhinoceros and a large male elephant; the latter, to all appearance, protecting a small herd which were retiring in a state of alarm. The elephant was worsted, and fled, followed by the rhinoceros, into a heavy jungle where much roaring was heard, but nothing could be discerned.

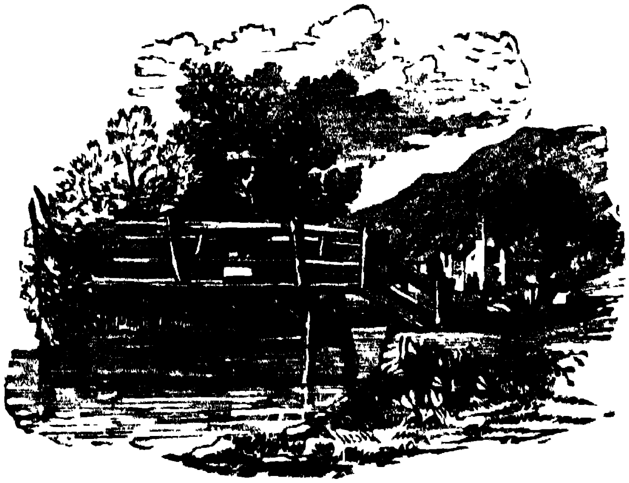
Trick-defence.—The rhinoceros, as well as the camel, is retromingent; and, like that animal, not only smells extremely rank, but its urine is highly offensive and corrosive. This might be of no moment, had not the rhinoceros a filthy trick of discharging his urine suddenly at such as are behind him, causing great pain and inflammation to the individual unfortunately operated upon. The lizard and spider are equally obnoxious on this account: they cling to the ceilings of houses in India, and sprinkle persons below; and if the part on which the urine falls be not immediately washed, a blister will soon rise, followed by an excoriation extremely hard to heal.—ORIENTAL FIELD SPORTS.

RHINOCEROS' SKIN.—The skin of the rhinoceros is much valued, and often sells for a great price. A shield made from it will resist a leaden bullet, which, for the most part flattens on it the same as when fired against a stone. An iron ball, however, from a smart piece, will generally penetrate, and such is invariably used by those who make a livelihood by selling the skin and tallow of the animal. The *shecarries*, or native sportsmen, who lie in wait for the rhinoceros, are ordinarily furnished with heavy matchlocks, such as are commonly appropriated for the defence of mud forts; they carry balls from one to three ounces weight. To the power of an iron ball, discharged from such a matchlock, even the rhinoceros must submit; though sometimes he will carry off one or more balls, and wander many hours before he drops. Levelling with precision at the eye, the *shecarrie* fires at the thorax, or under the flap of the shoulder, which generally proves a fatal wound.—ORIENTAL FIELD SPORTS.

PECULIARITY IN ITS HABITS.—One very striking peculiarity attends this animal—viz., that it invariably goes to the same spot to dung, until the heap becomes so high as to render further increase inconvenient, when a fresh spot is chosen, usually on a small opening in the midst of a heavy jungle. These heaps, while they serve as beacons to warn other animals, afford to the *shecarrie*, or native sportsman, an opportunity of making certain of his quarry. Much caution is necessary in approaching the purlieus of these extraordinary piles. The rhinoceros, with its quick sense of smelling, steals craftily through the cover, and not unfrequently surprises whoever unfortunately comes near its haunt.

SAVAGE DISPOSITION.—As an instance of the extremely savage disposition of the rhinoceros, I shall adduce a memorable circumstance which occurred in the year 1788. Two officers belonging to the troops cantoned at *Dinapore* went down to the river to shoot and hunt. They had encamped; when one morning as they were rising, about day-break, to quest for game, they heard a violent uproar, and, on looking out, found that a rhinoceros was goring their horses, both of which, being fastened by their head and heel ropes, were consequently unable to escape or to resist. This may serve as an example of the species of wanton attack in which this animal indulges.—ORIENTAL FIELD SPORTS.

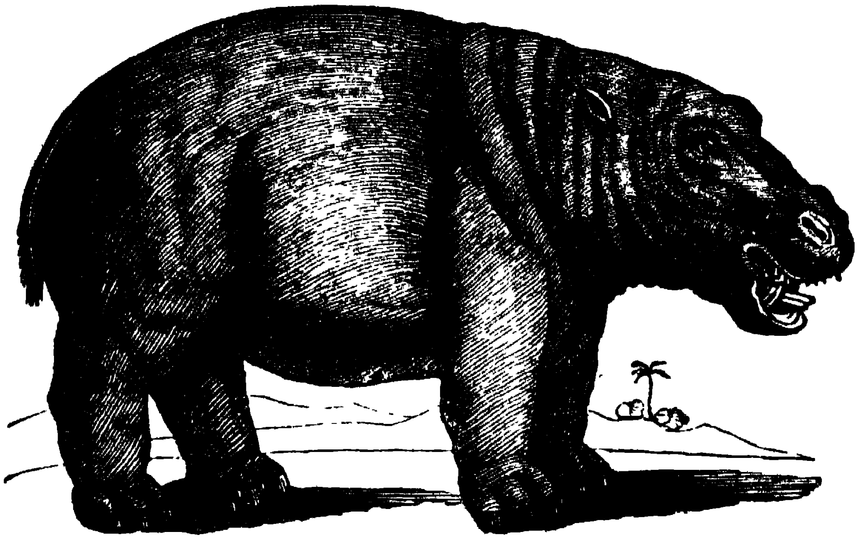
HORN—As an instance of the power of the horn of the rhinoceros, in the anecdote quoted of the wanton ferocity of this animal in goring the horses at Dinapore, one of the horses on that occasion was saddled, and was killed by a stroke of the horn; which not only penetrated through the saddle-flap and padding, but fractured two ribs, leaving a wound, through which a small hand might pass to the horse's lungs.—ED.



CHAP. XXIV.

THE HIPPOPOTAMUS.

The hippopotamus is an animal as large and not less formidable than the rhinoceros; its legs are shorter, and its head rather more bulky than that of the animal last described. We have had but few opportunities in Europe of examining this formidable creature minutely; its dimensions, however, have been pretty well ascertained by a description given us by Zerenghi, an Italian surgeon, who procured one of them to be killed on the banks of the river Nile. By his account, it appears that this terrible animal, which chiefly resides in the waters of that river, is above seventeen feet long from the extremity of the snout to the insertion of the tail; above sixteen feet in circumference round the body, and above seven feet high: the head is near four feet long and above nine feet in circumference. The jaws open about two feet wide, and the cutting-teeth, of which it has four in each jaw, are above a foot long.*



(The Hippopotamus.)

Its feet in some measure resemble those of the elephant, and are divided into four parts. The tail is short, flat, and pointed; the hide is amazingly thick, and though not capable of turning a musket-ball, is impenetrable to the blow of a sabre; the body is covered over with a few scattered hairs of a whitish colour. The whole figure of the animal is something between that of an ox and a hog, and its cry is something between the bellowing of the one and the grunting of the other.

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* Size of the Hippopotamus.—The head of a hippopotamus has recently been brought to England, with all the flesh about it, in a high state of preservation. This amphibious animal was harpooned while in combat with a crocodile, in a lake in the interior of Africa. The head measures near four feet long and eight feet in circumference: the jaws open two feet wide, and the cutting-teeth, of which it has four in each jaw, are above a foot long and four inches in circumference. Its ears are not bigger than a terrier's, and are much about the same shape. This formidable and terrific creature, when full-grown, measures about seventeen feet long from the extremity of the snout to the insertion of the tail, above sixteen feet in circumference round the body, and stands above seven feet high. It runs with astonishing swiftness for its great bulk at the bottom of lakes and rivers, but not with as much ease on land. When excited, it puts forth its full strength, which is prodigious. "I have seen," says a mariner, as we find it in Dampier, "one of these animals open its jaws, and seizing a boat between its teeth, at once bite and sink it to the bottom. I have seen it on another occasion place itself under one of our boats, and rising under it, overset it with six men who were in it, but who, however, happily received no other injury." At one time it was not uncommon in the Nile, but now it is no where to be found in that river, except above the cataracts.—Mag. Nat. Hist.

This animal, however, though so terribly furnished for war, seems no way disposed to make use of its prodigious strength against an equal enemy; it chiefly resides at the bottom of the great rivers and lakes of Africa; the Nile, the Niger, and the Zara; there it leads an indolent kind of life, and seems seldom disposed for action, except when excited by the calls of hunger. Upon such occasions, three or four of them are often seen at the bottom of a river near some cataract, forming a kind of line, and seizing upon such fish as are forced down by the violence of the stream. In that element they pursue their prey with great swiftness and perseverance; they swim with much force, and remain at the bottom for thirty or forty minutes without rising to take breath. They traverse the bottom of the stream, as if walking upon land, and make a terrible devastation where they find plenty of prey. But it often happens that this animal's fishy food is not supplied in sufficient abundance; it is then forced to come upon land, where it is an awkward and unwieldy stranger: it moves but slowly, and, as it seldom forsakes the margin of the river, it sinks at every step it takes; sometimes, however, it is forced by famine up into the higher grounds, where it commits dreadful havoc among the plantations of the helpless natives, who see their possessions destroyed, without daring to resist their invader. Their chief method is by lighting fires, striking drums, and raising a cry to frighten it back to its favourite element; and as it is extremely timorous upon land, they generally succeed in their endeavours. But if they happen to wound, or otherways irritate it too closely, it then becomes formidable to all that oppose it: it overturns whatever it meets, and brings forth all its strength, which it seemed not to have discovered before that dangerous occasion. It possesses the same inoffensive disposition in its favourite element, that it is found to have upon land; it is never found to attack the mariners in their boats, as they go up or down the stream; but should they inadvertently strike against it, or otherwise disturb its repose, there is much danger of its sending them, at once, to the bottom. "I have seen," says a mariner, as we find it in Dampier, "one of these animals open its jaws, and seizing any boat between its teeth, at once bite and sink it to the bottom. I have seen it upon another occasion, place itself under one of our boats, and rising under it, overset it with six men which were in it; who, however, happily received no other injury.* Such is the great strength of this animal; and from hence, probably, the imagination has been willing to match it in combat against others more fierce and equally formidable. The crocodile and shark have been said to engage with it, and yield an easy victory; but as the shark is only found at sea, and the hippopotamus never ventures beyond the mouth of fresh-water rivers, it is most probable that these engagements never occurred; it sometimes happens, indeed, that the princes of Africa amuse themselves with combats on their fresh-water lakes, between this and other formidable animals; but whether the rhinoceros or the crocodile are of this number, we have not been particularly informed. If this animal be attacked at land, and finding itself incapable of vengeance from the swiftness of its enemy, it immediately returns to the river, where it plunges in head foremost, and after a short time rises to the surface, loudly bellowing, either to invite or intimidate the enemy; but though the negroes will venture to attack the shark, or the crocodile, in their natural element, and there destroy them, they are too well apprized of the force of the hippopotamus to engage it; this animal, therefore, continues the uncontroled master of the river, and all others fly from its approach, and become an easy prey.

As the hippopotamus lives upon fish and vegetables, so it is probable the flesh of terrestrial animals may be equally grateful: the natives of Africa assert, that it has often been found to devour children and other creatures that it was able to surprise upon land; yet it moves but slowly, almost every creature endued with a common share of swiftness, is able to escape it; and this animal, therefore, seldom ventures from the river side, but when pressed by the necessities of hunger, or of bringing forth its young.

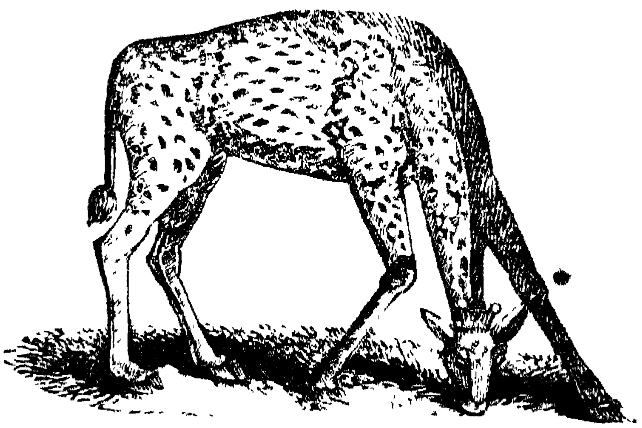
The female always comes upon land to bring forth, and it is supposed that she seldom produces above one at a time; upon this occasion, these animals are particularly timorous, and dread the approach of a terrestrial enemy; the instant the parent hears the slightest noise, it dashes into the stream, and the young one is seen to follow it with equal alacrity.

The young ones are said to be excellent eating; but the negroes, to whom nothing that has life comes amiss, find an equal delicacy in the old. Dr. Pococke has seen their flesh sold in the shambles, like beef; and it is said, that their breast, in particular, is as delicate eating as veal. As for the rest, these animals are found in great numbers, and as they produce very fast, their flesh might supply the countries where they are found, could those barbarous regions produce more expert huntsmen; it may be remarked, however, that this creature, which was once in such plenty at the mouth of the Nile, is now wholly unknown in Lower Egypt, and is no where to be found in that river, except above the cataracts.

CHAP. XXV.

THE CAMELOPARD.

Were we to be told of an animal so tall, that a man on horseback could with ease ride under its belly, without stooping, we should hardly give credit to the relation; yet of this extraordinary size is the camelopard, an animal that inhabits the deserts of Africa; and the accounts of which are so well ascertained that we cannot deny our assent to their authority. It is no easy matter to form an adequate idea of this creature's size, and the oddity of its formation. It exhibits somewhat of the slender shape of the deer, or the camel, but destitute of their symmetry, or their easy power of motion. The head somewhat resembles that of the deer, with two round horns, near a foot long, and which, it is probable, it sheds as deer are found to do; its neck resembles that of a horse; its legs and feet those of the deer, but with this extraordinary difference, that the fore legs are nearly twice as long as the hinder. As these creatures have been found eighteen feet high, and ten from the ground to the top of the shoulders, so allowing three feet for the depth of the body, seven feet remains, which is high enough to admit a man mounted upon a middle-sized horse. The hinder part, however, is much lower, so that when the animal appears standing, and at rest, it has somewhat the appearance of a dog sitting, and this formation of its legs gives it an awkward and a laborious motion; which, though swift, must yet be tiresome. For this reason the camelopard is an animal very rarely found, and only finds refuge in the most internal desert regions of Africa. The dimensions of a young one, as


(The Camelopard.)

they were accurately taken by a person who examined its skin, that was brought from the Cape of Good Hope, were found to be as follow: the length of the head was one foot eight inches; the height of the fore leg, from the ground to the top of the shoulder, was ten feet; from the shoulder to the top of the head, was seven; the height of the hind leg was eight feet five inches; and from the top of the shoulder to the insertion of the tail, was just seven feet long.

No animal, either from its disposition, or its formation, seems less fitted for a state of natural hostility; its horns are blunt, and even knobbed at the ends; its teeth are made entirely for vegetable pasture; its skin is beautifully speckled with white spots upon a brownish ground; it is timorous and harmless, and notwithstanding its great size, rather flies from, than resists the slightest enemy; it partakes very much of the nature of the camel, which it so nearly resembles; it lives entirely upon vegetables, and when grazing, is obliged to spread its fore legs very wide, in order to reach its pasture; its motion is a kind of pace, two legs on each side moving at the same time, whereas in other animals they move transversely. It often lies down with its belly to the earth, and, like the camel, has a callous substance upon its breast, which, when reposed, defends it from injury. This animal was known to the ancients, but has been very rarely seen in Europe.* One of them was sent from the East to

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* THE GIRAFFE.—The history of the giraffe affords one of the most striking examples of the slow and uncertain progress of natural history, and strongly points out the necessity of unwearied research and repeated observation to ensure its advancement. Indeed it appears scarcely credible that the quadruped which exceeds every other in its lofty stature, which bears so remote a resemblance to any in its extraordinary proportions, and is equalled by so few in the beauty of its colouring, should have remained till within sixty years of the present time so obscurely known as to have had its very existence cast into doubt. But the descriptions of this animal which appeared in the middle ages having been overlooked, the more ancient notices, vague and imperfect as they in general were, while they seemed to ascribe to the camelopardalis a combination of the characteristics of a ferocious beast of prey with those of the harmless ruminant, began at length to be regarded with the same degree of distrust as the fabulous narratives of the unicorn and sphinx.

In the year 1770, after three centuries and a half had elapsed without any example of the giraffe, dead or alive, having appeared in Europe, this impression seems to have become so general, that the Royal Society thought it proper to publish in their Transactions the simple recital of a traveller who had himself seen and procured a representation of the living giraffe. Capt. Carteret, in his communication to that learned body, says, "Inclosed I have sent you the drawing of a camelopardalis, as it was taken off from the life, of one near the Cape of Good Hope. I shall not attempt here to give you any particular description of this scarce and curious animal, as it is much better known to you than it can be to me; but from its scarcity, as I believe none have been seen in Europe since Julius Cæsar's time, (when I think there were two of them at Rome,) I imagine its drawing, and a more certain knowledge of its reality, will not be disagreeable to you. As the existence of this fine animal has been doubted by many, if you think it may afford any pleasure to the curious, you will make what use of it you please." He goes on to say, that a party of men sent by the Governor of the Cape of Good Hope on an inland discovery, found two of these creatures; but they caught only the young one, from which the drawing was taken, and the skin of which was sent to Holland "as a confirmation of the fact."

Ten years after this announcement of the actual existence of the giraffe the skin of a fine male specimen was brought to this country by Lieut. Paterson, by whom it had been shot in the interior of Caffraria. This skin was presented to the celebrated John Hunter, and still forms part of his collection preserved at the Royal College of Surgeons. It was the first example of the remains of the camelopardalis ever brought into England, and excited the greatest interest at the time. Since that period, however, fresh specimens have been rapidly added to the different European collections of natural history, the results of exploratory journeys in the interior of Africa, effected by modern zeal and enterprise; but it was only within a very few years that the habits and gait of this extraordinary species could in modern Europe be again contemplated in the living animal.

The Pasha of Egypt having learnt that the Arabs of the province of Sennaar in Nubia had succeeded in bringing up two young giraffes with camel's milk, caused them to be brought to Cairo; and after resting for three months in his gardens, to prepare them for a journey of greater difficulty and hazard, they were embarked in boats and conveyed down

the emperor of Germany, in the year 1559, but they have often been seen tame at Grand Cairo in Egypt; and I am told there are two there at present. When

the Nile to Alexandria, where they were consigned to the English and French consuls, as presents from the Pasha to their respective sovereigns.

These young giraffes were both females; but as there was some difference in their size, the consuls of each nation drew lots for them, when the shortest and weakest fell to the lot of England. The giraffe destined for our sovereign was conveyed to Malta under the charge of two Arabs, and was from thence forwarded to London in a merchant vessel, and arrived on the 11th of August 1827. The animal was conveyed to Windsor two days after in a spacious caravan, and was lodged in a commodious hut, with the range of a spacious paddock, in the late king's private menagerie at Sandpit Gate. Shortly after its arrival at this place it was accurately measured, and its dimensions were found to be—

	Ft.	In.
From the top of the head to the bottom of the hoof - - - - - - - - - - -	10	8
From the top of the head to the root of the neck	4	0
Length of the back - - - - - -	3	1
From the croup to the bottom of the hoof -	2	9
Length of the head - - - - - -	1	9

It was at that time exceedingly playful; but as its growth proceeded, which was rapid, (having increased eighteen inches in less than two years,) it became much less active; its health evidently declined; its legs almost lost their power of supporting the body; the joints seemed to *shoot over;* and at length the weakness increased to such a degree, that it became necessary to have a pulley constructed, which, being suspended from the ceiling of the animal's hovel, was fastened round its body, for the purpose of raising it on its legs without any exertion on its own part. From the harmless disposition and uniform gentleness of this animal, the interest which it had excited in his late Majesty was very great; but notwithstanding every attention, it died in the following year. Its food was barley, oats, split beans, and ash leaves. It was never observed to drink any other fluid than milk, its preference for which probably arose from that fluid being so long the only sustenance afforded it while living among the Arabs.

Owing to the distance from town at which this animal was kept, and the state of confinement which its weakly condition rendered indispensable during the latter period of its existence, the living giraffe was seen in this country by comparatively few individuals. The skin, however, and skeleton, both beautifully prepared, are preserved in the Museum of the Zoological Society,—the munificent donations of his present Majesty.

The full-grown male giraffe is reported to be sometimes nearly twenty feet high, from the summit of the head to the sole of the foot. The highest specimen, however, in the British museum, (which is a beautiful male brought over by Mr. Burchell,) measures seventeen feet six inches; the remainder do not exceed sixteen feet. The greatest peculiarity in this animal, and what most strikes the eye of the observer, is the remarkable disproportion of the different parts of its frame. The head and the trunk are of extreme shortness, especially when compared with the neck and legs, which are as disproportionately elongated. The trunk, for example, is divided into three equal parts, the fore and hind quarters having respectively the same length as the intermediate division,—a circumstance which occurs in no other quadruped. To this curtailed trunk are attached legs of extreme length, which, if they were of the ordinary proportions, would have rendered the giraffe the swiftest of animals: but the contrary is, in some measure, the result; for while the fore and hind pair of legs are too closely approximated, they are also of unequal length, and this inequality is so disposed as to retard swiftness of motion. The hare and the greyhound have the hinder legs the longest; and as these are the principal propellers in locomotion, hence results the peculiar and proverbial swiftness of these quadrupeds; but in the giraffe, the proportions of the extremities are reversed, and consequently, when compelled to flight, although from his superior stature, he can, for a short distance, outstrip his pursuers, yet he soon grows weary, and becomes incapable of sustaining a prolonged chase.

With respect to the habits of the giraffe in a state of nature, our knowledge is confessedly vague and general. The Arabs who accompanied the two young females from which the preceding description has been drawn, asserted that they were taken at a distance of eight or ten days' journey of the caravans, to the south of Sennaar, not far from a district which was mountainous, and covered with deep and extensive forests. It may be presumed that this country is near to where the Nile and its tributary streams begin to leave the mountains of Abyssinia to flow along the plains; and here the Arabs stated that ostriches, gazelles, antelopes, a small species of lion and panthers abounded, while deeper in the forests, elephants and rhinoceroses were met with. They observed that the giraffes were found in small number, that they inhabited the forests, and rarely appeared on the plain, when they were united in groups of three and four, two old ancient Rome was in its splendour, Pompey exhibited, at one time, no less than ten upon the theatre. It was the barbarous pleasure of the people, at that time, to see the most terrible, and the most extraordinary animals produced in

ones, and one or two young ones, but seldom more. They do not fly at the first view of man; but if he approaches them, they suddenly start off in a gallop or succession of bounds with such speed, that they leave far behind them the swiftest horses. However, if they happen to be driven fairly into the plain, they are soon run down, being much shorter-winded than the horse: but when thus fatigued, they make a sudden turn to the right-about, and defend themselves vigorously with their fore-feet, which they fling out with great force: in fact, the Arabs are unable to take the full-grown giraffes alive, and are obliged to kill them on the spot. They eat the flesh; and out of the skin, which is hard and thick, they make long straps, cut from the top of the head to the end of the fore feet. The old giraffes are asserted by the Arabs to be able to defend themselves successfully by kicks of their fore feet against the most redoubtable animal of the desert. The lion, which learns by experience the resources opposed to him by the giraffe, and the futility of pursuit along the plain, prefers waiting near a stream where that animal drinks, or crouches in view of the grove of Mimosæ, whose summits afford him a rich pasturage, and by a single bound falls unawares upon his prey, which is thus taken by surprise, and unable to put into use its natural means of defence. If, however, the lion in springing from his ambuscade miscalculates his leap, and is unable to fix on the hinder parts of the giraffe, the latter makes head against him, and often renders mortal the first blow, from the violent and rapid flinging out of the fore legs: should he miss his stroke, however, and the lion succeed in fixing upon him, he becomes defenceless, and falls a victim.

The giraffe in a state of captivity, when teased or offended, manifests his natural mode of defence by striking out with his fore legs, and sometimes by kicking with the hinder ones like a horse; but he has never been observed to butt, or to make any demonstration with his horns, but on the contrary always keeps his head raised as high as possible when he is disquieted or afraid.

The Arabs assert that the only chance of taking the giraffe alive is while he still suckles; and even then it most frequently happens that in their struggles to free themselves they break some of their limbs, or dislocate their neck; at other times they refuse all sustenance, pine away, and die. If, however, they chance to be preserved for a few days, they then become tranquil and soon familiar, readily following those who have the care of them, and even horses or camels.—ZOOLOGICAL MAGAZINE.

THE PARISIAN GIRAFFE.—That sent by the Pasha of Egypt, and consigned to the *Jardin des Plantes* at Paris, is thus described: "The queen of the garden," says Mr. R. Lee, "is the giraffe, to which I paid frequent visits. She is the only survivor of the three which left Africa much about the same time, and inhabits the large round building in the centre of the menagerie, called the *Rotonde*. Great care is taken to shelter her from the cold, and in the winter she has a kind of hood and cape, which reach the length of her neck, and a body-cloth, all made of woollen materials. She is only suffered to walk in her little park when the sun shines upon it; and if care and attention can compensate for the loss of liberty, she ought to be the happiest of her kind. She stands about twelve and a half feet high, and her skin, with its light brown spots, shines like satin; but I confess I was disappointed with regard to its beauty. She looks best when lying down, or standing perfectly upright, in which posture she is very dignified; but the moment she moves, she becomes awkward, in consequence of the disproportion of the hinder parts of her body, and the immense length of her neck, which, instead of being arched, forms an angle with her shoulders. When she gallops, her hind feet advance before those in front, and the peculiarity of gait caused by moving the hind and fore feet on the same side, at the same time, is very striking. She has great difficulty in reaching the ground with her mouth, and was obliged to make two efforts to separate her fore legs, before she could reach a cistern placed on the pavement. Her head is of remarkable beauty, and the expression of her full black eyes is mild and affectionate. Her tongue is long, black, and pointed. She is extremely gentle, yet full of frolic and animation, and when walking in the menagerie, her keeper is obliged to hold her head to prevent her biting off the young branches of trees. Her great delight, however, is to eat rose-leaves, and she devours them with the greatest avidity. The African cows, with humps on their shoulders, which supplied her with milk during her passage to Europe, are as gentle as their nursling, and when feeding her they come and softly push your elbows to have a share. The keeper, whose name is Ati, and who is from Darfur, is a tall, well-proportioned black, and at his own request, a little gallery has been erected for him in the stable of his charge, where he sleeps and keeps all his property. When in attendance, combat against each other. The lion, the lynx, the tiger, the elephant, the hippopotamus, were all let loose promiscuously, and were seen to inflict indiscriminate destruction.*

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he dresses in the turban, vest and full trousers of his country, but when he walks Paris, he assumes the European costume; for in his native garb all the children in the streets recognise him, and calling out, "*Ali, Ali, comment va la giraffe?*" hurt his consequence.—Magazine of Natural History.

* Distinctions of the Giraffe.—As a live camelopard has been sent to London and another to Paris, the history and habits of these animals have excited some interest. At a meeting of the Academy of Sciences in Paris, on the 2nd of July last M. Geoffroy Saint-Hilaire observed that naturalists were wrong in supposing that there was only one species of the camelopard. The animal now in Paris differs from the Cape of Good Hope species by several essential anatomical characters; and he proposes to distinguish it by the name of the *Giraffe of Sennaar*, the country from which it comes. Some natives of Egypt having come to see the one in Paris in the costume of the country, the animal gave evident proofs of joy, and loaded them with caresses. This fact is explained by the circumstances that the giraffe has an ardent affection for its Arabian keeper, and that it naturally is delighted with the sight of the turban and the costume of its keeper.

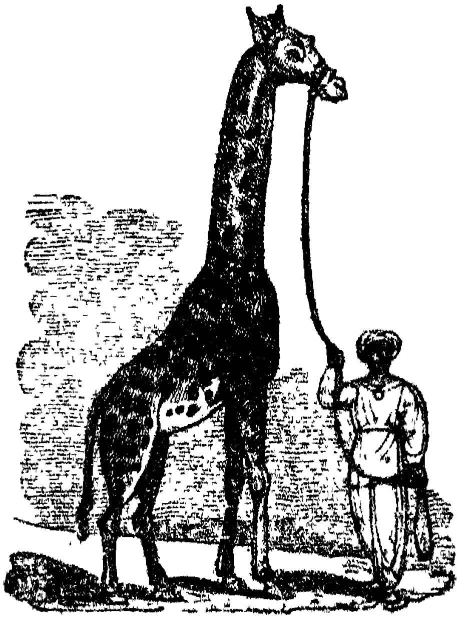
Some authors have proved the mildness and docility of the camelopard, while others represent it as incapable of being tamed. This difference is ascribed by M. Saint-Hilaire to difference of education. Four or five years ago a male giraffe, extremely savage, was brought to Constantinople. The keeper of the present giraffe had also the charge of this one, and he ascribes its savageness entirely to the manner in which it was treated.

At the same time M. Mongez read a memoir on the testimony of ancient authors respecting the giraffe. Moses is the first author who speaks of it. As Aristotle does not mention it, M. Mongez supposes that it was unknown to the Greeks, and that it did not then exist in Egypt, otherwise Aristotle, who travelled there, must have known about it. In the year 708 of Rome, Julius Cæsar brought one to Europe, and the Roman emperors afterwards exhibited them at Rome, either for the games in the circus, or in their triumphs over the African princes. Albertus Magnus, in his treatise *De Animalibus*, is the first modern author who speaks of the giraffe. In 1486, one of the Medici family possessed one at Florence, where it lived for a considerable time.

In its native country the giraffe browses on the twigs of trees, preferring plants of the Mimosa genus; but it appears that it can without inconvenience subsist on other vegetable food. The one kept at Florence fed on the fruits of the country, and chiefly on apples, which it begged from the inhabitants of the first storeys of the houses. The one now in Paris, from its having been accustomed in early life to the food prepared by the Arabs for their camels, is fed on mixed grains bruised, such as maize, barley, &c., and it is furnished with milk for drink morning and evening. It however willingly accepts fruits and the branches of the acacia which are presented to it. It seizes the leaves with its long, rugous, and narrow tongue by rolling it about them, and seems annoyed when it is obliged to take any thing from the ground, which it seems to do with difficulty. To accomplish this, it stretches first one, then the other of its long fore legs asunder, and it is not till after repeated attempts that it is able to seize the objects with its lips and tongue.

The pace of the giraffe is an amble, though when pursued it flies with extreme rapidity; but the small size of its lungs prevents it from sustaining a lengthened chase. The giraffe defends itself against the lion, its principal enemy, with its fore feet, with which it strikes with such force as often to repulse him. The specimen in the museum at Paris is about two years and a half old.

The name *Camelopardalis* (camel-leopard) was given by the Romans to this animal, from a fancied combination of the characters of the camel and leopard, but its ancient denomination was *Zurapha*, from which the name Giraffe has been adopted.—Arcana of Science, 1828.



CHAP. XXVI.

THE CAMEL, AND THE DROMEDARY.

(The Camel.)

THESE names do not make two distinct kinds, but are only given to a variety of the same animal, which has, however, subsisted time immemorial. The principal, and perhaps the only sensible difference, by which those two races are distinguished, consists in this, that the camel has two bunches upon his back, whereas the dromedary has but one; the latter also, is neither so large nor so strong as the camel.* These two races, however, produce with each other, and the mixed breed formed between them is considered the best, the most patient, and the most indefatigable of all the kind.

Of the two varieties, the dromedary is by far the most numerous, the camel being scarcely found except in Turkey and the countries of the Levant, while the other is found spread over all the deserts of Arabia, the southern parts of Africa, Persia, Tartary, and a great part of the Eastern Indies. Thus the one inhabits an immense tract of country, the other in comparison is confined to a province; the one inhabits the sultry countries of the torrid zone, the other delights in a warm, but not a burning climate; neither, however, can subsist or propagate in the variable climes towards the north; they seem formed for those countries where shrubs are plenty and water scarce; where they can travel along the sandy desert without being impeded by rivers, and find food at expected distances; such a country is Arabia, and this, of all others, seems the most adapted to the support and production of this animal.

The camel is the most temperate of all animals, and it can continue to travel several days without drinking. In those vast deserts, where the earth is every where dry and sandy; where there are neither birds nor beasts, neither insects nor vegetables, where nothing is to be seen but hills of sand and heaps of bone, there the camel travels, posting forward, without requiring either drink or pasture, and is often found six or seven days without any sustenance whatsoever. Its feet are formed for travelling upon sand, and utterly unfit for moist or marshy places; the inhabitants, therefore, find a most useful assistant in this animal, where no other could subsist, and by its means, cross those deserts with safety, which would be unpassable by any other method of conveyance.†

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* **CAMEL AND DROMEDARY.**—The term dromedary properly applies to a very swift species of camel. A dromedary is to a camel what a racer is to a horse of burden. There are one-humped and two-humped dromedaries, and one-humped and two-humped camels.

† **CAMEL'S FOOT.**—The camel's tread is perfectly noiseless: unlike the horse, whose heavy tramp sounds over the plain, and rattles on the pavement, its foot-fall is silent and unheard. "What always struck me," says Mr. Macfarlane, in his 'Constantinople in 1828,' "as something extremely romantic and mysterious, was the *noiseless* step of the camel, from the spongy nature of his foot. Whatever be the nature of the ground, sand, or rock, or turf, or paved stones, you hear no foot-fall; you see an im-

An animal thus formed for a sandy and desert region, cannot be propagated in one of a different nature. Many vain efforts have been tried to propagate the camel in Spain; they have been transported into America, but have mulitiplied in neither. It is true, indeed that they may be brought into these countries, and may, perhaps, be found to produce there; but the care of keeping them is so great, and the accidents to which they are exposed, from the changeableness of the climate, are so many, that they cannot answer the care of keeping. In a few years also, they are seen to degenerate: their strength and their patience forsake them; and instead of making the riches, they become the burden of their keepers.

But it is very different in Arabia, and those countries where the camel is turned to useful purposes. It is there considered as a sacred animal, without whose help the natives could neither subsist, traffic, nor travel; its milk makes a part of their nourishment; they feed upon its flesh, particularly when young; they clothe themselves with its hair, which it is seen to molt regularly once a year; and if they fear an invading enemy, their camels serve them in flight, and in a single day they are known to travel above a hundred miles. Thus, by means of the camel, an Arabian finds safety in his deserts: all the armies upon earth might be lost in the pursuit of a flying squadron of this country, mounted upon their camels, and taking refuge in solitudes where nothing interposes to stop their flight, or to force them to wait the invader.* Nothing can be more

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mense animal approaching you *stilly* as a cloud floating on air; and unless he wear a bell, your sense of hearing, acute as it may be, will give you no intimation of his presence."

The foot of this animal, (so often referred to, and not without reason, as an evidence of design,) is divided into two toes, each having a horny tip; the division is not, however, complete; for an elastic pad or cushion, constituting the main part upon which the pressure falls, spreads broadly beneath, connecting them together, but leaving the points free. On pressing the ground, the elastic cushion expands, and the toes diverge, so that a larger surface is brought in contact with the sandy earth, a circumstance which, in connexion with the elastic nature of the sole, if we may so call it, enables the creature to tread over the yielding desert, or the hard and arid plain, with almost equal comfort.

The foot of the camel, certainly formed by nature to tread a loose sandy soil, "does not, however, appear to me," says the writer just quoted, "to suffer from stony or hard roads. In Asia Minor there are mountains in every direction; the paths across them are hard, rough, and loose, as rocks and broken stones can make them; yet I have often seen camels treading them without any appearance of suffering; and though I have met them in my travels, hundreds in a day, I do not remember having ever seen a wounded hoof."

The soil most inimical to the foot of the camel is such as is soft and muddy; here the animal, slipping at every step, keeps on its legs with difficulty. It is said that so great is its dislike to venture upon such a track, that its drivers have been obliged to spread their tent coverings over the obnoxious ground, in order to conceal its appearance, and induce the animal to proceed.—RELIGIOUS TRACT SOCIETY'S NATURAL HISTORY.

* ARABIAN HORSE AND CAMEL.—It is an erroneous opinion which believes Arabia to be very rich in horses. Many tribes are wholly unprovided with them, and Burckhardt supposes that there do not exist 50,000 of those animals between the extreme boundaries of the Euphrates and Syria, a much smaller number than the same extent of ground would furnish in any other part of Asia or Europe. The Syrian districts, especially Hauran produce the best; but of pure Arabian blood of the choicest breeds, few have ever been exported. If a Bedouin wishes to express his admiration of the speed of another's mare, he blesses the animal copiously, and addressing her master, says, "Go and wash your mare's feet and drink up the water." The best Arabian camel, after three whole days' abstinence from water, shows manifest signs of great distress; in case of absolute necessity, it might *possibly* go five days without drinking; but this trial can never be required, since there is no route across the Arabian desert in which wells are farther distant from each other than three days and a half. Burckhardt never heard an instance of a camel being slaughtered for the sake of the water in its stomach. The extremity of thirst, indeed, induces the traveller, unable to support the exertion of walking, to cling as a last resouce to this serviceable animal, nor does its stomach, unless on the first day's watering, afford by any means a copious supply. The swiftness of the camel has been greatly exaggerated: 115 miles in eleven hours, during which occured

dreary than the aspect of these sandy plains, that seem entirely forsaken of life and vegetation: wherever the eye turns, nothing is presented but a steril and dusty soil, sometimes torn up by the winds, and moving in great waves along, which, when viewed from an eminence, resemble less the earth than the ocean: here and there a few shrubs appear, that only teach us to wish for the grove that remind us of the shade in these sultry climates, without affording its refreshment; the return of morning, which, in other places, carries an idea of cheerfulness, here serves only to enlighten the endless and dreary waste, and to present the traveller with an unfinished prospect of his forlorn situation; yet in this chasm of nature, by the help of the camel, the Arabian finds safety and subsistence. There are here and there found spots of verdure, which, though remote from each other, are, in a manner, approximated by the labour and industry of the camel. Thus these deserts, which present the stranger with nothing but objects of danger and sterility, afford the inhabitant protection, food, and liberty. The Arabian lives independent and tranquil in the midst of his solitudes; and instead of considering the vast solitudes spread round him as a restraint upon his happiness, he is by experience taught to regard them as the ramparts of his freedom.

The camel is easily instructed in the methods of taking up and supporting his burthen; their legs, a few days after they are produced, are bent under their belly; they are in this manner loaded, and taught to rise; their burthen is every day thus increased, by insensible degrees, till the animal is capable of supporting a weight adequate to its force the same care is taken in making them patient of hunger and thirst: while other animals receive their food at stated times, the camel is restrained for days together, and these intervals of famine are increased in proportion as the animal seems capable of sustaining them. By this method of education, they live five or six days without food or water; and their stomach is formed most admirably by nature to fit them for long abstinence: besides the four stomachs which all animals have that chew the cud, (and the camel is of the number,) it has a fifth stomach which serves as a reservoir, to hold a greater quantity of water than the animal has an immediate occasion for. It is of a sufficient capacity to contain a large quantity of water, where the fluid remains without corrupting, or without being adulterated by the other aliments: when the camel finds itself pressed with thirst, it has here an easy resource for quenching it; it throws up a quantity of this water

two passages over the Nile in a ferry-boat, each requiring twenty minutes, is the most extraordinary performance which Burckhardt ever heard authenticated; and this, probably, has been surpassed by an English trotting mare. He thinks that, if left to its own free will, this animal would have travelled 200 miles in twenty-four hours; twelve miles an hour is the utmost trotting pace of a camel; it may gallop nine miles in half an hour, but it cannot support that pace, which is unnatural to it, for a longer time. Nothing can be easier than its common amble of five and a half miles an hour, and if properly fed every evening, or in case of emergency once in two days, it will continue this pace uninterruptedly for five or even six days. While the hump continues full, the animal will endure considerable fatigue on a very short allowance, feeding, as the Arabs say, on the fat of its own hump. After a long journey the hump almost entirely subsides, and it is not until after three or four months' repose, and a considerable time after the rest of the carcass has acquired flesh, that it resumes its natural size, of one-fourth of the whole body. The full growth of the camel is attained at twelve years, he lives forty, but at about or under thirty his activity declines. In Egypt, camels are kept closely shorn, and are guided by a string attached to the nose-ring. Those of Arabia are seldom perforated in the nose; and readily obey the short stick of the rider. The camel-saddle of the Arabian women is gaudily fitted out, and a lady of Nadja considers it a degradation to mount any other than a *black camel*, while an Æzeman beauty prefers one which is *grey* or *white*. Cautery to the chest or the hump is usually applied when their broken-winded caravan-camel is exhausted by fatigue. Towards the close of a long journey, scarcely an evening passes without this operation, yet the load is replaced on the following morning on the part recently burned, and no degree of pain induces the patient animal to refuse or throw it off. If once sinks, however, overpowered either by hunger or toil, it cannot be compelled to rise again.—Arcana of Science, 1833.

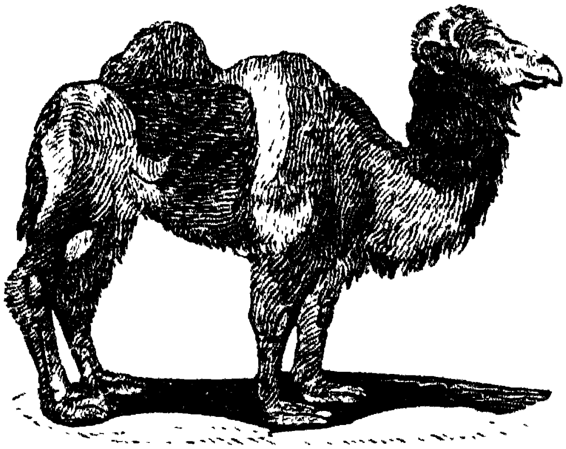
by a simple contraction of the muscles, into the other stomachs, and this serves to macerate its dry and simple food; in this manner, as it drinks but seldom, it takes in a large quantity at a time, and travellers, when straightened for water, have been often known to kill their camels for that which they expected to find within them.

In Turkey, Persia, Arabia, Barbary, and Egypt, their whole commerce is carried on by means of camels, and no carriage is more speedy, and none less expensive in these countries. Merchants and travellers unite themselves into a body, furnished with camels, to secure themselves from the insults of the robbers that infest the countries in which they live. This assemblage is called a caravan, in which the numbers are sometimes known to amount to above ten thousand, and the number of camels is often greater than those of the men. each of these animals is loaded according to his strength, and he is so sensible of it himself, that when his burthen is too great, he remains still upon his belly, the posture in which he is loaded, refusing to rise, till his burthen be lessened or taken away. In general, the large camels are capable of carrying a thousand weight, and sometimes twelve hundred, the dromedary from six to seven. In these trading journeys they travel but slowly: their stages are generally regulated, and they seldom go above thirty, or at most about five and thirty miles a day. Every evening, when they arrive at a stage, which is usually some spot of verdure, where water and shrubs are in plenty, they are permitted to feed at liberty; they are then seen to eat as much in an hour as will supply them for twenty-four: they seem to prefer the coarsest weeds to the softest pasture; the thistle, the nettle, the cassia, and other prickly vegetables, are their favourite food; but their drivers take care to supply them with a kind of paste composition, which serves as a more permanent nourishment. As these animals have often gone the same track, they are said to know their way precisely, and to pursue their passage when their guides are utterly astray: when they come within a few miles of their baiting place in the evening, they sagaciously scent it a distance, and increasing their speed, are often seen to trot with vivacity to their stage.

The patience of this animal is most extraordinary; and it is probable that its sufferings are great, for when it is loaded, it sends forth most lamentable cries, but never offers to resist the tyrant that oppresses it. At the slightest sign, it bends its knees, and lies upon its belly, suffering itself to be loaded in this position; by this practice the burthen is more easily laid upon it, than if lifted up while standing; at another sign it rises with its load, and the driver getting upon its back between the two panniers, which, like hampers, are placed upon each side, he encourages the camel to proceed with his voice and with a song. In this manner the creature proceeds contentedly forward, with a slow uneasy walk of about four miles an hour, and when it comes to its stage, lies down to be unloaded as before.

Buffon seems to consider the camel to be the most domesticated of all other creatures, and to have more marks of the tyranny of man imprinted on its form. He is of opinion that this animal is not now to be found in a state of nature, that the humps on its back, the callosities upon its breast and its legs, and even the great reservoir for water, are all marks of long servitude and domestic constraint. The deformities he supposes to be perpetuated by generation, and what at first was accident at last becomes nature. However this be, the humps upon the back grow large in proportion as the animal is well fed, and if examined, they will be found composed of a substance not unlike the udder of a cow.

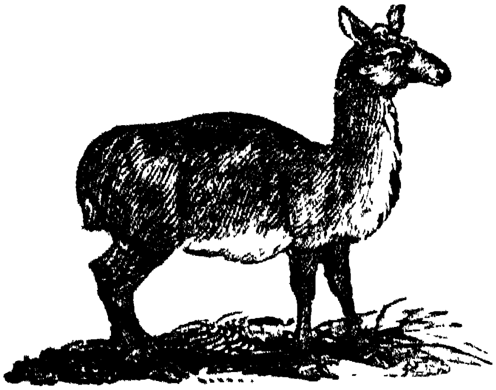
The inhabitants generally leave but one male to wait on ten females; the rest they castrate, and though they thus become weaker, they are more manageable and patient. The female receives the male in the same position as when these animals are loaded; she goes with young for about a year, and like all other great animals, produces but one at a time. The camel's milk is abundant and nourishing, and mixed with water makes a principal part of the beverage of the Arabians. These animals begin to engender at three years of age, and they ordinarily live from forty to fifty years. The genital part of the male resembles that of the bull, but is placed pointing backwards, so that its urine seems to be ejected in the manner of the female. This, as well as the dung, and almost every part of this animal, is converted to some useful purpose by the keepers. Of the urine sal ammoniac is made; and of the dung, litter for the horses, and fire, for the purpose of dressing their victuals. Thus this animal alone seems to comprise within itself a variety of qualities, any one of which serves to render other quadrupeds absolutely necessary for the welfare of man: like the elephant, it is manageable and tame; like the horse, it gives the rider security; it carries greater burthens than the ox or the mule; and its milk is furnished in as great abundance as that of the cow; the flesh of the young ones is supposed to be as delicate as veal; their hair is more beautiful, and more in request than wool; while even of its very excrements, no part is useless.


(The Dromedary.)

CHAP. XXVII.

THE LLAMA.

As almost all the quadrupeds of America are smaller than the resembling ones of the ancient continent, so the llama, which may be considered as the camel of the new world, is every way less than that of the old.* This animal, like that described in the former chapter, stands high upon its legs, has a long neck, a small head, and resembles the camel, not only in its natural mildness, but its aptitude for servitude, its moderation, and its patience. The Americans early found out its useful qualities, and availed themselves of its labours: like the camel, it serves to carry goods over places inaccessible to other beasts of burthen; like that it is obedient to its driver, and often dies under, but never resists his cruelty.


(The Llama.)

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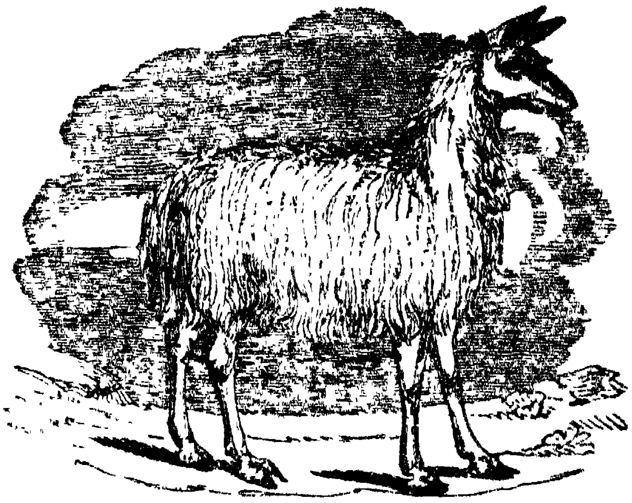
* Llamas of South America.—The llamas of South America furnish a beautiful example of the determination of the locality of a particular group of animals, according to the elevation of the surface where they find their food. The selection is probably determined by the temperature. The llamas are stationed upon different stages of the Cordilleras, and are found, or disappear, throughout that enormous chain of mountains, as the summits are elevated or depressed. Thus they range considerably below the line of per-



(The White Llama.)

Of these animals, some are white, others black, but they are mostly brown, its face resembles that of the camel, and its height is about equal to that of an ass. They are not found in the ancient continent, but entirely belong to the new; nor are they found spread over all America, but are found chiefly upon those mountains that stretch from New Spain to the Straits of Magellan. They inhabit the highest regions of the globe, and seem to require purer air than animals of a lower situation are found to enjoy. Peru seems to be the place where they are found in greatest plenty. In Mexico they are introduced rather as curiosities than beasts of burthen; but in Potosi and other provinces of Peru, they make the chief riches of the Indians and Spaniards who rear them: their flesh is excellent food; their hair, or rather wool may be spun into beautiful clothing; and they are capable, in the most rugged and dangerous ways, of carrying burthens not exceeding a hundred weight, with the greatest safety. It is true indeed that they go but slowly, and seldom above fifteen miles a day; their tread is heavy, but sure; they descend precipices, and find footing among the most craggy rocks where even men can scarce accompany them; they are, however, but feeble animals, and after four or five days' labour, they are obliged to repose for a day or two. They are chiefly used in carrying the riches of the mines of Potosi, and we are told that there are above three hundred thousand of these animals in actual employ.

This animal, as was said before, is above three feet high, and the neck is three feet long; the head is small and well proportioned, the eyes large, the nose long, the lips thick, the upper divided, and the lower a little depending; like all those animals that feed upon grass, it wants the upper cutting teeth; the ears are four inches long, and move with great agility; the tail is but five inches long, it is small, straight, and a little turned up at the end; it is cloven-footed, like the ox, but it has a kind of spear-like appendage behind, which assists it in moving over precipices and rugged ways; the wool on the back is short, but long on the sides and the belly; it resembles the camel in the formation of the genital parts in the male, so that it makes urine backwards; it couples also in the same manner, and though it finds much difficulty in the action, it is said to be much inclined to venery. A whole day is often passed before the necessary business can be completed, which is spent in growling, quarrelling, and spitting at each other; they seldom produce above one at a time, and their age never extends above ten or twelve years at farthest.

Though the llama is no way comparable to the camel, either for size, strength, or perseverance, yet the Americans find a substitute in it, with which they seem perfectly contented. It appears formed for that indolent race of masters which

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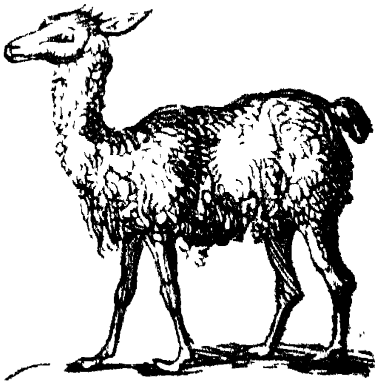
petual snow, from Chili to New Granada, without reaching the isthmus of Panama. The species is not to be found in Mexico; and this remarkable circumstance is to be ascribed to the fact that the isthmus of the Cordilleras has a less elevation than is suited to their natures and wants In the same way some of the Alpine animals of Europe, which never descend into the plains, are found upon mountains at long intervals, although the line of their summits is interrupted. This locality is determined by elevation. The same fact is constantly observed with regard to plants.

it is obliged to serve; it requires no care, nor no expense in the attending or providing for its sustenance; it is supplied with a warm covering, and therefore does not require to be housed; satisfied with vegetables and grass, it wants neither corn nor hay to subsist it; it is not less moderate in what it drinks, and exceeds even the camel in temperance. Indeed, of all other creatures, it seems to require water least, as it is supplied by nature with saliva in such large quantities, that it spits it out on every occasion: this saliva seems to be the only offensive weapon that the harmless creature has to testify its resentment. When overloaded, or fatigued, and driven on by all the torturing acts of its keeper, it falls on its belly, and pours out against him a quantity of this fluid; which, though probably no way hurtful, the Indians are much afraid of. They say that wherever it falls, it is of such an acrimonious nature, that it will either burn the skin, or cause very dangerous eruptions.

Such are these animals in their domestic state; but as they are found wild in very great numbers, they exhibit marks of great force and agility in their state of nature. The stag is scarcely more swift, or the goat or the shammoy a better climber. All its shapes are more delicate and strong; its colour is tawny, and its wool is but short; in their native forests they are gregarious animals, and are often seen in flocks of two or three hundred at a time. When they perceive a stranger, they regard him at first with astonishment, without marking any fear or surprise; but shortly, as if by common consent, they snuff up the air, somewhat like horses, and at once, by a common flight, take refuge on the tops of the mountains: they are fonder of the northern than the southern side of the Andes; they often climb above the snowy tracts of the mountain, and seem vigorous in proportion to the coldness of their situation. The natives hunt the wild llama for the sake of its fleece. If the dogs surprise one upon the plain, they are generally successful; but if once the llama obtains the rocky precipice of the mountain, the hunters are obliged to desist in their pursuit.

The llama seems to be the largest of the camel kind in America; there are others which are called guanacoes and pacos, that are smaller and weaker, but endued with the same nature, and formed pretty much in the same manner. They seem to bear the same proportions to each other that the horse does to the ass, and are employed with the same degree of subordination. The wool, however, of the paco seems to be the most valuable, and it is formed into stuffs, not inferior to silk either in price or beauty. The natural colour of the paco is that of a dried rose leaf; the manufacturers seldom give its wool any other dye, but form it into quilts and carpets which exceed those from the Levant. This manufacture forms a very considerable branch of commerce in South America, and probably too, might be extended to Europe, were the beauty and the durability of what is thus wrought up sufficiently known.[*]


(The Tawny Llama.)

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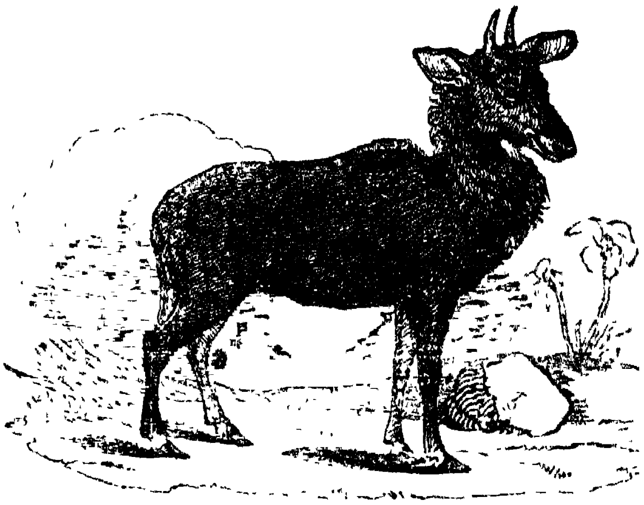
[*] **Llamas in England.**—Llamas have been frequently brought to England within the last twenty years, and have been exhibited in the menageries. His Majesty George the fourth had several at Windsor, which were allowed to range in a paddock, but they did not long endure the climate.

The greatest number of llamas that were ever brought over to Europe at one time, was a herd that arrived at Cadiz in 1808. It originally consisted of thirty-six individuals. They were brought from Lima in Peru and Conception in Chili, to Buenos Ayres, by slow journeys of two or three leagues. They were fed on the road with potatoes, maize, and hay. Eleven only of the number arrived at Cadiz, of which two died there. These animals were brought to Europe, as a present from Godoy (the Prince of Peace) to the Empress Josephine; but they arrived just at the period of his disgrace, at the commencement of the Spanish revolution, and the populace, in hatred to their late minister, were about to throw the llamas into the sea. The governor of Cadiz however, rescued them, and Marshal Soult, who subsequently traversed the province, took them under his care.—Ed.

CHAP. XXVIII.

THE NYL-GHAU.

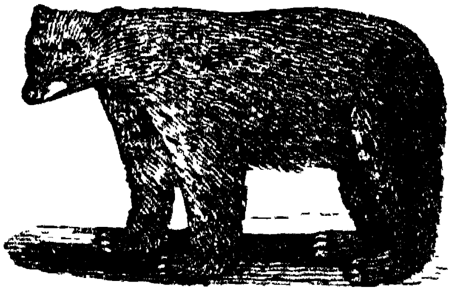
THIS animal, the name of which is pronounced nylgaw, is a native of India, and has but lately been imported into Europe; it seems to be of a middle nature, between the cow and the deer, and carries the appearance of both in its form. In size, it is as much smaller than the one, as it is larger than the other; its body, horns, and tail, are not unlike those of a bull; and the head, neck, and legs, are very like those of a deer. The colour, in general, is ash or grey, from a mixture of black hairs and white; all along the ridge or edge of the neck, the hair is blacker, larger, and more erect, making a short, thin, and upright mane. Its horns are seven inches long; they are six inches round at the foot, growing smaller by degrees, they terminate in a blunt point. The bluntness of these, together with the form of its head and neck, might incline us to suppose it was of the deer kind; but as it never sheds its horns, it has a greater affinity to the cow.


(The Nyl-ghau)

From the disposition of that brought over to this country, which has been very accurately and minutely described by Dr. Hunter, their manners were harmless and gentle. Although in its native wildness, it is said to be fierce and vicious, this seemed pleased with every kind of familiarity, and always licked the hand that stroked, or gave it bread, and never once attempted to use its horns offensively; it seemed to have much dependence on its organs of smell, and snuffed keenly, and with noise, whenever any person came within sight; it did so likewise when any food or drink was brought to it; and was so easily offended with smells, or so cautious, that it would not taste the bread which was offered, when the hand happened to smell strong of turpentine. Its manner of fighting is very particular. It was observed, at Lord Clive's, where two males were put into a little inclosure, that, while they were at a considerable distance from each other, they prepared for the attack by falling upon their fore knees; then they shuffled towards each other with a quick pace, keeping still upon their fore knees, and when they were come within some yards, they made a spring, and darted against each other. The intrepidity and force with which they dart against any object, appeared by the strength with which one of them attempted to overturn a poor labourer who unthinkingly stood on the outside of the pales of its inclosure. The nyl-ghau, with the quickness of lightning, darted against the wood-work with such violence that he broke it to pieces, and broke off one of his horns close to the root, which occasioned the animal's death. At all the places in India where we have settlements, they are considered as rarities, and brought from the distant interior parts of the country. The emperor, sometimes kills them in such numbers, as to distribute quarters of them to all his omrahs, which shows that they are internally wild and in plenty, and esteemed good or delicious food. The nyl ghaus which have been brought to England, have been most, if not all of them, received from Surat or Bombay; and they seem to be less uncommon in that part of India than in Bengal; which gives room for a conjecture that they may be indigenous, perhaps, in the province of Guzarat, one of the most western and the most considerable of the Hindostan empire, lying to the northward of Surat, and stretching away to the Indian ocean.

CHAP. XXIX.

THE BEAR.



(The Bear.)

Of the bear there are three different kinds, the brown bear of the Alps, the black bear of North America, which is smaller, and the great Greenland, or white bear.* These, though different in their form, are no doubt of the same original, and owe their chief variations to food and climate. They have all the same habitudes, being equally carnivorous, treacherous, and cruel. It has been said indeed, that the black bear of America rejects animal food, but of the contrary I am certain, as I have often seen the young ones, which are brought over to London, prefer flesh to every kind of vegetable aliment.

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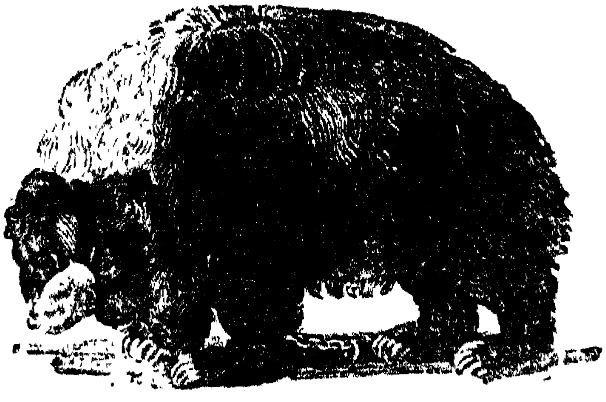
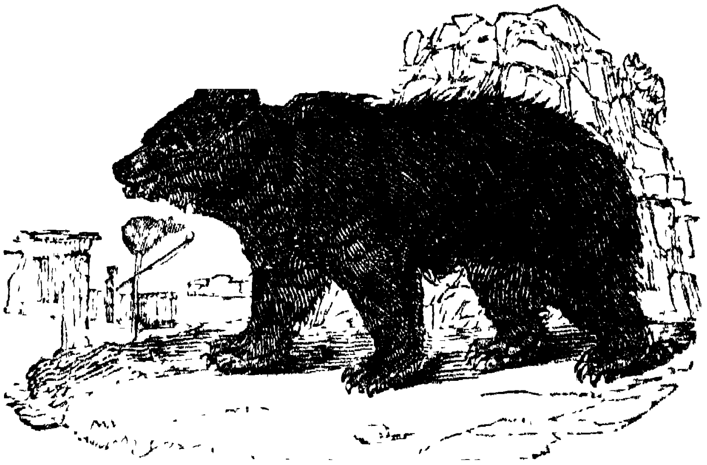
* THE LABIATED BEAR OR URSINE SLOTH (*Shaw*.) In the year 1792, there was shown in London, under the name of *man-monster*, an unknown animal from the neighbourhood of Patna in Bengal. Pennant and Shaw, who examined it, said it had grinders and canine teeth, but no fore teeth, and hence they referred it to the genus Bradypus or Sloth, and from its general resemblance to the bear, named it *Ursine Sloth*. This erroneous opinion was adopted by several succeeding naturalists. Illiger referred it to the family Tardigrada, considering the description of Pennant and Shaw as correct, but on account of the form and number of its teeth, and the form of its claws, he separated it from the genus Bradypus, and described it as a distinct genus under the name Prochilus, from its remarkably movable and extensile lip. It is also mentioned by Cuvier; but he hesitates as to its true place in the system, and remarks that the form of its teeth does not agree with those of the sloth tribe. Very lately, Tidemann, the celebrated comparative anatomist, had an opportunity of examining a live specimen of this curious animal, and was thus enabled to refer it to its true place in the system. He finds that it is provided with cutting teeth, and belongs not to the sloth, but to the bear, or ursus tribe. According to Dr. Francis Hamilton, it lives in holes which it digs, and subsists on fruits, sorgho, and white ants.

"Of all bears the labiated or sloth bear presents the rudest and most shapeless figure. One might suppose that our great countryman Ray had had this species especially under



(The Ursine Sloth.)

The brown bear is properly an inhabitant of the temperate climates; the black finds subsistence in the northern regions of Europe and America; while the great white bear takes refuge in the most icy climates, and lives where scarce any other animal can find subsistence.


(The Brown Bear.)

The brown bear(*g*) is not only savage but solitary; he takes refuge in the most unfrequented parts, and the most dangerous precipices of uninhabited mountains. It chooses its den in the most gloomy parts of the forest, in some cavern that has been hollowed by time, or in the hollow of some old enormous tree. There it retires alone, and passes some months of the winter without provisions, or without ever stirring abroad. However this animal is not entirely deprived of sensation like the bat or his eye when he characterized the ursine genus. The whole of its body and legs are concealed beneath a coat of long, coarse, black hair, out of which there projects in front a narrow, elongated, ill-shapen snout; while beneath this shaggy penthouse four great paws, turned awkwardly inwards, bespeak the quadruped. Such, at least, is the general appearance of two of this species at present living in the Gardens of the Zoological Society, where, however, both the density and length of the covering may, perhaps, in some measure, be ascribable to the influence of our northern climate. This bear is, however, in its natural haunts, distinguished from all its tropical congeners by its denser coat of hair; and it is doubtless owing to this natural protection that it is enabled to brave our winters with impunity, even when its den is placed in a comparatively unsheltered situation. The hair upon the back of the head and neck is so remarkably developed as to represent a sort of mane exceeding a foot in length, and almost hiding the ears. The labiated bear differs also from the rest of the genus, in losing, at an early period of its existence, the whole or greater part of the incisor or front teeth; his nostrils are supported by a peculiarly large and movable cartilaginous plate, by means of which he can open or close their apertures at will, and in this way probably defends the nasal passages from the ants, into whose nests he intrudes his snout. The lips of this species are soft and fleshy, and susceptible of varied and extensive motion, often being elongated in a tubular form three or four inches beyond the jaws. It is from this peculiarity that the commonly adopted trivial name, *labiatus*, has been derived. The labiated bear is a native of Hindostan, more especially the mountainous districts. It is common in Bengal, on the mountains of Silhet, and in the Deccan Ghauts. Its first appearance in this country was about fifty years ago. Bewick, in his History of Quadrupeds, has given a characteristic figure and an accurate description of this species; and from the striking correspondence of parts observable between it and the common bear, as well as from an attentive examination of its disposition and manners, he was induced to place it in the same genus, notwithstanding it seemed to differ in some of those characteristics, which have been pointed out by naturalists as the guides to a regular and systematic arrangement. In an earlier and ruder figure, which we find in Caton's Figures of Animals, the good sense of the artist also detected the true relations of this subject, and the animal is called the *Petre Bear.* There are few of our readers who, if they were asked if they had ever seen a living sloth, would not answer in the affirmative, and perhaps be inclined to receive with incredulity our assertion, that their curiosity, with respect to this singular animal, still remains to be gratified. But the fact is, that the animal, which is exhibited as the sloth in the travelling menageries, is the bear now under consideration; and we are not aware that either of the true species of sloth, which is peculiar to South America, has hitherto been brought alive to this country.—ZOOLOGICAL MAGAZINE.

(*g*) Buffon.

the dormouse, but seems rather to subsist upon the exuberance of its former flesh, and only feels the calls of appetite when the fat it had acquired in summer begins to be entirely wasted away. In this manner when the bear retires to its den, to hide for the winter, it is extremely fat; but at the end of forty or fifty days, when it comes forth to seek for fresh nourishment, it seems to have slept all its flesh away. It is a common report, that during this time, they live by sucking their paws, which is a vulgar error that scarce requires confutation.* These solitary animals couple in autumn, but the time of gestation with the female is still unknown: the female takes great care to provide a proper retreat for her young, she secures them in the hollow of a rock, and provides a bed of hay in the warmest part of the den; she brings forth in winter, and the young ones begin to follow her in spring. The male and female by no means inhabit the same den; they have each their separate retreat, and seldom are seen together but upon the accesses of genial desire.

The voice of the bear is a kind of growl, interrupted with rage, which is often capriciously exerted; and though this animal seems gentle and placid to its master, when tamed; yet it is still to be distrusted and managed with caution, as it is often treacherous and resentful without a cause.

This animal is capable of some degree of instruction. There are few but have seen it dance in awkward measures upon its hind feet, to the voice or the instrument of its leader; and it must be confessed that the dancer is often found to be the best performer of the two. I am told that it is first taught to perform in this manner, by setting it upon hot plates of iron, and then playing to it while in this uneasy situation.

The bear, when come to maturity, can never be tamed; it then continues in its native fierceness, and though caged, still formidably impotent, at the approach of its keeper flies to meet him. But notwithstanding the fierceness of this animal, the natives in those countries where it is found, hunt it with great perseverance and alacrity. The least dangerous method of taking it is by intoxicating it, by throwing brandy upon honey, which it seems to be chiefly fond of, and seeks for in the hollow of trees. In Canada, where the black bears are very common, and where their dens are made in trees, that are hollow towards the top, they are taken by setting fire to their retreats, which are often above thirty feet from the ground The old one is generally seen first to issue from her den, and is shot by the hunters. The young ones, as they descend, are caught in a noose, and are either kept or killed for provision. Their paws are said to be a great delicacy, and their hams are well enough known at the tables of the luxurious here. Their fat also, which still preserves a certain degree of fluidity, is supposed to be an efficacious remedy in white or indolent tumours, though probably very little superior to hog's lard.

The white Greenland bear differs greatly, both in figure and dimensions, from those already described, and though it preserves in general the external form of its more southern kindred, yet it grows to above three times the size. The brown bear is seldom above six feet long; the white bear is often known from twelve to thirteen. The brown bear is made rather strong and sturdy, like the mastiff; the Greenland bear, though covered with very long hair, and apparently bulky, is nevertheless more slender, both as to the head, neck, and body, and more inclining to the shape of the greyhound In short, all the variations of its figure and its colour, seem to proceed from the coldness of the climate where it resides, and the nature of the food it is supplied with.

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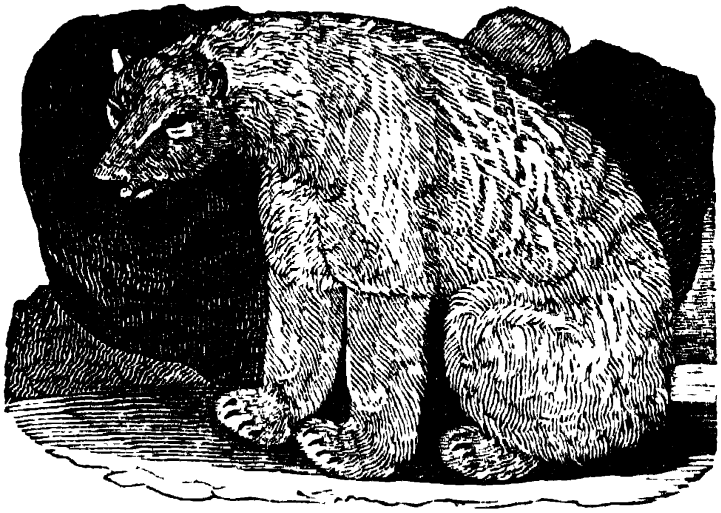
* **Sucking his Paws** --This exploded notion arose, perhaps, from the fact of the bear obtaining a new skin on the balls of his feet during the winter months. By licking his paws whilst in his den, the operation of nature is no doubt facilitated "These animals," says Mr Lloyd, "when last I saw them were constantly sucking, or *mumbling*, as the Swedes term it, their own legs and paws, the operation which was often continued for hours together, was attended with a murmuring kind of noise, which might be heard at some distance In consequence of this, their legs or feet were generally covered with saliva, or rather foam, which by ignorant people might not improbably be taken for the milk which it was at one time said the bear was in the habit of extracting from his paws."

The white bear seems the only animal, that by being placed in the coldest climate, grows larger than those that live in the temperate zones.* All other species of animated nature diminish as they approach the poles, and seem contracted in their size by the rigours of the ambient atmosphere; but the bear, being unmolested in these desolate climates, and meeting no animal but what he can easily conquer, finding also a sufficient supply of fishy provisions, he grows to an enormous size; and as the lion is the tyrant of an African forest, so the bear remains undisputed master of the icy mountains in


(The Polar Bear.)

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* Polar Bear.—In the arctic regions where the vegetable kingdom is feebly represented by lichens and mosses, but where, on the contrary, the ocean teems with myriads of small mollusca, and at the same time exhibits animal life under its bulkiest forms,—here the polar bear is found laying wait for and combating the walrus and the seal; pursuing and overtaking in its own element the swift salmon; employing stratagem to surprise the smaller quadrupeds and birds which in summer-time visit the higher latitudes; less delicate also in his appetites than the more strictly carnivorous quadrupeds, this species does not disdain to feast on the stranded carcass of the whale; and being of a slothful disposition, he prefers this more easy and more abundant sustenance to that which demands from him more active predatory exertions.

In the tropical regions, on the contrary, where vegetation is exhibited under the most luxuriant forms and in the greatest profusion, the bears live almost exclusively on vegetable matter; and it is interesting to observe that these species are the smallest of the genus, and are consequently best fitted for climbing; whilst the bears inhabiting the wilds of Siberia, the Rocky Mountains of North America, and the arctic icebergs, attain that superior size and strength which enable them to execute the acts of destruction necessary for their own support and existence.

Besides differences in size and colour, there are few characteristics by which the species can be distinguished from each other; and these marks of distinction are by no means prominent or easily perceived. Linnæus, who had never had an opportunity of examining the polar bear, doubted even its specific difference from the brown bear, which consequently was the only one admitted into his catalogue of species.

This species ranks among the larger productions of the animated creation; but it must be observed that in the accounts of the older navigators its size has been greatly exaggerated. Those seen by the naturalists who accompanied Captain Parry in the northern expeditions, did not in general exceed seven or eight feet in length. Captain Lyon has given the dimensions of one which was considered to be unusually large, being 8 feet 7½ inches long, and weighing 1,600 lbs. A female which was attended by two cubs, was killed on the 31st of August, 1822, and was so small that two or three men were able to lift her into a boat; yet she must have attained the period at which she was capable of propagating her kind on or before the autumn of the preceding year.

In its choice of habitation the polar bear differs most from the rest of the species. Instead of seeking concealment in the depths of forests, it prefers the floating iceberg and the open sea, its powers of swimming peculiarly adapting it to that sphere of existence. It rarely frequents the coasts of the Frozen Ocean, and does not descend to the eastern boundary of Siberia, nor to Kamtschatka: and although it is met with on the north coast of America and in Hudson's Bay, it does not inhabit the islands between America and Siberia. They resort to Spitzbergen in great numbers, and sometimes are transported on the ice to the coasts of Iceland and Norway; but the inhabitants of these places destroy them as soon as they are detected. The part of Siberia where they are found to be most numerous is at the mouths of the rivers Lena and Janissea.

Spitzbergen and Greenland. When our mariners land upon those shores, in such parts as have not been frequented before, the white bears come down to view them with an awkward curiosity; they approach slowly, seeming undetermined whether to advance or retreat, and being naturally a timorous animal, they are only urged on by the conscious experience of their former victories; however, when they are shot at, or wounded, they endeavour to fly, or finding that impracticable, they make a fierce and desperate resistance till they die. As they live upon fish and seals, their flesh is too strong for food, and the captors have nothing but the skin, to reward them for the dangers incurred in the engagement.

The number of these animals that are found about the north pole, if we consider the scarcity thereof, of all other terrestrial creatures, is very amazing. They are not only seen at land, but often on ice-floats several leagues at sea. They are often transported in this manner to the very shores of Iceland, where they no sooner land but all the natives are in arms to receive them. It often happens, that when a Greenlander and his wife are paddling out at sea, by coming too near an ice-float, a white bear unexpectedly jumps into their boat, and if he does not overset it, sits calmly where he first came down, and like a passenger suffers himself to be rowed along. It is probable the poor little Greenlander is not very fond of his new guest, however he makes a virtue of necessity, and hospitably rows him to shore.

As this animal lives chiefly upon fish, seals, and dead whales, it seldom removes far from the shore. When forced by hunger, it often ventures into the deep, swims after seals, and devours whatever it can seize; it is however but a bad swimmer, and it is often hunted in this manner by boats, till it is fatigued, and at last destroyed. It often happens that a battle ensues between a bear and a morse or a whale; as the latter are more expert in their own element, they generally prove victorious. However, when the bear can find a young whale, it repays him for the danger he incurs of meeting with the parent*

The females go with young six or seven months, and are supposed to bring forth in the month of March. The number of their young is generally two, which follow their dam everywhere, subsisting on her milk until the winter that succeeds their birth. It is said that the mother carries them on her back when she swims from iceberg to iceberg Nothing precisely is known of the longevity of the polar bear. It is hunted principally for its hide and fur, which from the softness of its texture is more esteemed than that of the brown bear.—ZOOLOGICAL MAGAZINE.

* BEAR IN INDIA.—Many persons have disputed the existence of the bear in India. Facts, however, impose a silence on all attempts at reasoning on this point, as to its heavy coat of hair, and the heat of the country; for to the great annoyance of the villagers, bears not only exist in India, but do much mischief to the crops, and occasionally devour many of the inhabitants.

The Bengal bear is distinguished by the deep black colour of his hair, and by a crescent of white hair like a gorget on his breast. The hind legs are shorter, and the paws flatter and longer than those of European breed; his pace is more shuffling, awkward, and laboured, though quick enough to overtake a man on foot; and his hair is long, and thinly scattered over his body. He is remarkably active in climbing; frequently when not more than a month old, a cub will ascend to the shoulders of his keeper with great ease, and descend again stern foremost with equal adroitness. They are of a most sanguinary disposition, and will chew and suck at a limb till it be a perfect pulp. They do not bite away the flesh like most beasts of prey, but prefer extracting the blood and juices by suction. While stationed at Dacca, I went with a party several times to the great house at Tergong, distant about five miles from the town. I had on several occasions seen bears among the wild mango tops, and did not consider them as being so dangerous, until one day as I was returning with a friend from hunting some hog-deer, we heard a most lamentable outcry in the cover through which we had to pass. Having our spears, and being provided with guns, we alighted, no doubting but a leopard had attacked som poor woodcutter. We met a woman whos fears had deprived her of speech, and whos senses were just flitting. She, however, collected herself sufficiently to pronounce the word *bauloo*, which signifies a bear. She led us with caution to a spot not more than fifty yards distant, where we found her husband extended on the ground, his hands and feet as I before observed, sucked and chewed into a perfect pulp, the teguments of the limbs in general drawn from under the skin, and the skull mostly laid bare, the skin of it hanging down in long strips, obviously effected by their talons. What was most singular, was, that the unhappy man retained his senses sufficiently to describe that he had been attacked by several bears — the woman said seven—one of which embraced him while the others clawed him about the head, and bit at his arms and legs, seemingly in competition for the booty. We conveyed the wretched object to the house, where, in a few hours, death relieved him from a state in which no human being could afford the smallest assistance. These merciless brutes dash from the covers, both single and in numbers, to attack passengers. As to escaping into trees, that would be poor evasion; for the bear climbs with astonishing ease. Among the many anecdotes related of this animal, the following, which I believe to be true, is perhaps as whimsical as any that could be adduced.

A gentleman, who was proceeding post to Mednapore, found his *palankeen* suddenly put down, or rather dropped, without much ceremony or regard to its contents, by the bearers, who as abruptly took to their heels in various directions. On putting his head out to ascertain the cause of so unpleasant a circumstance, the gentleman discovered a half-grown bear smelling about the machine. Bruin no sooner saw the traveller than he boldly entered at one side; and, as the *palankeen* was of the old fashion, with a highly arched bamboo, he could not be opposed. The gentleman thought it necessary to relinquish his situation in favour of his shaggy visiter; who, with as little ceremony as he had entered, passed through, following the gentleman with some very suspicious hints, such as barking and champing of the teeth. After some manœuvres on both sides, a close action commenced, in which either party at times might claim the victory. The bearers had collected themselves on a high spot, whence they could have an excellent " bird's eye view " of the battle; but whether from prudence, or impelled by curiosity to ascertain what would be the result of an engagement between an English gentleman and a Bengal bear, all kept aloof from the combatants. As the chances varied, so did the bearers express their approbation; applauding each as he seemed by his superiority to merit their plaudits. When the gentleman chanced to have he upper hand, they cheered him with " *Sawbash saheb*,"—*i. e.*, well done, master; and when the bear became lord of the ascendant, they paid the just tribute to his exertions with " *Sawbash bauloo*," —*i. e.*, well done, Mr. Bear. Now and then an interjection, *wau! wau!* expressive of the highest admiration, was uttered with no small emphasis, indiscriminately, as it might be in justice merited by either party.

Fortunately the gentleman succeeded, and after receiving many desperate wounds, throttled the bear. When the contest was over the bearers returned, and after overwhelming their master with compliments, bore him on his journey. On their arrival at the next stage, the bearers were all taken into custody; and the magistrate, according to the laudable custom prevalent in India, where offences are punished without very nicely examining the exact spot and hour of perpetration, bestowed on each of the critics a hearty chastisement in the market-place; while the applauding crowd of spectators did not fail, at each turn of the instrument, to repeat " *Sawbash saheb!*" and when pain induced the culprits to writhe, in hopes to evade the whip, others would ironically exclaim, " *Sawbash bauloo!*" —Oriental Field Sports.

Ring Bears. — Bears have occasionally white rings round their necks. At this very time, indeed, I have two of these animals in my possession, whose mother I shot in the Scandinavian forests. They are male and female: the female has that peculiar mark— the male, however, is without it: this contradicts the commonly received opinion that the ring is confined to the male bears. On this subject, Mr. Nilsson, who has recently published a work on Scandinavian Zoology, observes, that " bears usually lose the ring after the second or third year; some few, however, preserve it all their lives, and these are called ring-bears.—Lloyd's Field Sports.

Scandinavian Bears.—Many naturalists assert that the Scandinavian bear does not subsist upon flesh. For years bears reside in the neighbourhood of cattle without doing them any injury, although, as is notoriously the fact, they will sometimes visit herds solely from the desire of prey. Young bears seldom molest cattle; but old bears, after having tasted blood, often become very destructive. " The bear," Mr. Nilsson observes, " is more or less noxious as the weather varies; for if it be clear and dry, his attacks upon cattle are less frequent than when the summer is wet and cloudy." The bear feeds on roots, and the leaves and small branches of the aspen, mountain ash, and other trees. He is also fond of succulent plants, such as angelica, mountain thistle, &c.; to berries he is likewise very partial—of these he devours vast quantities. Ripe corn he also eats, and he sometimes commits no little havoc amongst it; for, seating himself on his haunches in a field of it, he collects with his outstretched arms nearly a sheaf at a time, the ears of which he then devours.

During the summer the bear is always lean; but in the autumn, when the berries are ripe, and he has consequently a greater facility of obtaining food, he generally becomes very fat. Towards the end of October, however, he ceases for that year to feed; his bowels and stomach become quite empty and contracted into a very small compass, whilst the extremity of them is closed by an indurated substance which in Sweden is called *tappen*. This is composed, as it is said, of the last substances, such as pine leaves, and what he obtains from the ant-hills, of which the bear has eaten. If, in the course of the winter, the bear be frightened out of his den and very severely hunted, he once in a while passes the *tappen* — in which case, it is said, he immediately grows excessively thin. Though the *tappen* has probably been known to the bear-hunters of the north for ages, Mr. Falk was, I believe, the first to bring the circumstance before the notice of the public. I have had a *tappen*, taken from one of the bears that I myself killed in the winter season, carefully analyzed, the component parts of which were as follow:—

Brown resin.

Green essential (volatile) oil; smells like turpentine.

Pale yellow fat (fixed) oil; smells rancid.

Chlorophyle, colouring matter of leaves.

Starch.

Lignia.

Pectic acid.

Formic acid.

Sulphates, phosphates, and muriates.

Leaves of Scotch fir, juniper

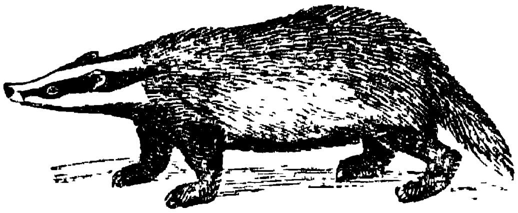
The ashes contain oxides of iron and manganese kali.—LLOYD'S FIELD SPORTS.

STRENGTH.—The bear is a fast and good swimmer, and in hot weather bathes frequently; he climbs well, but in descending trees or precipices always comes down backwards. The strength of the bear is very great, but we cannot credit the statement made by Mr. Lloyd quoting from Nilsson, "that a bear has been seen walking on his hinder feet along a small tree (stock) that stretched across a river, bearing a dead horse in his fore paws!" The prowess of the bear, with all respect for Nilsson's veracity may be surprising, but when we are told "that several instances have occurred of their climbing on to the roofs of cowhouses, tearing the same off, descending and slaughtering the poor animals confined within, and actually carrying them away by shoving or lifting them through the aperture by which they themselves had entered," we would pause and seek to be assured that Scandinavian cows are not English calves.—ED.

COURAGE.—Mr. Lloyd quotes an anecdote, of many amusing ones of Frederick the First, King of Sweden, who had a very large lion presented to him by the Barbary powers. There were several bears kept by the butchers about the shambles in Stockholm, and his Majesty being anxious to witness a rencontre between one of these animals and the lion, ordered them to be brought into contact with each other. In the lion's den there were two apartments, into one of which the bear was introduced. On the lion, however, getting access to that animal, he found him posted in a corner; when going up to him, he gave him a slight rap with his paw, as if to see of what materials his visiter was composed. The bear not liking this kind of salutation, growled and endeavoured to parry it. This made the lion angry; when, "with one fell swoop," with his paw, as the story goes, he laid the bear dead at his feet. It is of course idle, continues that writer, to make a comparison between the powers of the lion and the bear, from the anecdote I have just related; I think, however, that there are bears to be found in the Scandinavian forests, that even the lord of the African deserts would find some difficulty in annihilating at a single blow. Nilsson, the Swedish writer, observes that the bear's attack on men or inferior animals is always commenced with the fore paws, with which he either strikes like the cat, or endeavours to squeeze his enemy to death. Men that have been struck, that gentleman observes, have mostly been hit with the fore paws on the upper part of the head, with such force, that the whole skull has been laid entirely bare.—LLOYD'S FIELD SPORTS.

CHAP. XXX.

THE BADGER.



(The Badger.)

The badger's legs are so short, that its belly seems to touch the ground; this however is but a deceitful appearance, as it is caused by the length of the hair, which is very long all over the body, and makes it seem much more bulky than it really is. It is a solitary, stupid animal, that finds refuge remote from man, and digs itself a deep hole with great assiduity. It seems to avoid the light, and seldom quits its retreat by day, only stealing out at night to find subsistence. It burrows in the ground very easy, its legs being short and strong, and its claws stiff and horny. As it continues to bury itself, and throw the earth behind it to a great distance, and thus forms to itself a winding hole, at the bottom of which it remains in safety. As the fox is not so expert at digging into the earth, it often takes possession of that which has been quitted by the badger, and some say, forces it from its retreat by laying its excrements at the mouth of the badger's hole

This animal, however, is not long in making itself a new habitation, from which it seldom ventures far, [illegible] it flies but slowly, and can find safety only in the strength of its retreat. When it is surprised by the dogs at some distance from its hole, it then combats with desperate resolution; it falls upon its back, defends itself on every side, and seldom dies unrevenged in the midst of its enemies.

The badger, like the fox, is a carnivorous animal, and nothing that has life can come amiss to it.* It sleeps the greatest part of its time, and thus, without being a voracious feeder, it still keeps fat, particularly in winter. They always keep their hole very clean, and when the female brings forth, she makes a comfortable warm bed of hay, at the bottom of her hole, for the reception of her young. She brings forth in summer, generally to the number of three or four, which she feeds at first with her milk, and afterwards with such petty prey as she can surprise. She seizes the young rabbits in their warren, robs birds' nests, finds out where the wild bees have laid up the honey, and brings all to her expecting brood.

The young ones when taken are easily tamed, but the old still continue savage and incorrigible; the former, after a short time, play with the dogs, follow their master about the house, but seem of all other animals the most fond of the fire. They often approach it so closely, that they burn themselves in a dangerous manner. They are sometimes also subject to the mange, and have a gland under their tail, which scents pretty strongly. The poor of some countries eat their flesh, which, though fat, is at best but rank and ill tasted.†

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* Food.—The principal food of the badger is roots, fruits, snails, and worms. It seems quite a mistake, their living on animal food.

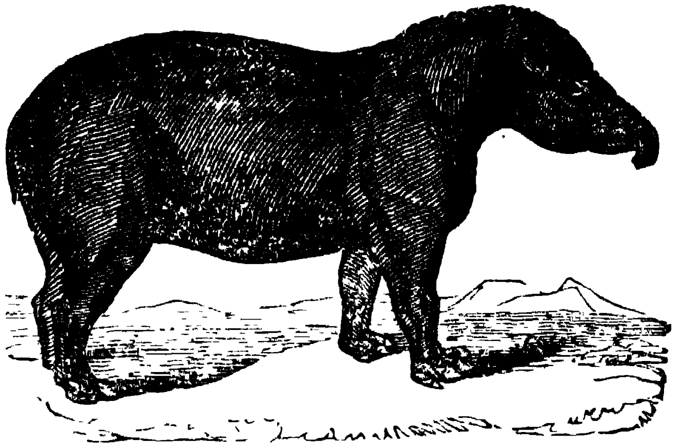
† The Spotted Badger.—The spotted badger is of a white colour, marked with reddish, yellow, and dusky spots. It inhabits Europe and the north of Asia, as far as the northern provinces of Persia and China, and in Japan. The white badger is said by Brisson to have been brought from New York; it has very small eyes and very short legs, and is only one foot nine inches long, with a tail of nine inches.

The American Badger inhabits Labrador, and the country about Hudson's Bay. It has a strong resemblance to the common or European badgers, but is somewhat smaller, and the hair is longer, more soft and silky; the ears are short, and of a white colour, edged with black.

CHAP. XXXI.

THE TAPIR.

There seems to be a rude, but inferior resemblance between many animals of the old and the new world. The cougar of America resembles the tiger in natural ferocity, though far inferior in its dimensions. The llama bears some affinity to the camel, but is far behind it in strength and utility. The tapir may be considered as the hippopotamus of the new continent, but degraded both as to its size and ferocity.


(The Tapir.)

This animal bears some distant resemblance in its form to a mule. It has a long snout, which it lengthens or contracts at pleasure. Its ears are small, long, and pendent. Its neck and tail are short, and its claws strong and firm, of which it has four upon each foot. Its skin is thick, and covered with brown hair, and the natives make shields of it which cannot be pierced by an arrow.

This animal may in some measure be termed amphibious, as it chiefly resides in the water. It differs, however, from all others of this kind, in feeding entirely upon vegetables, and not making this element the place of its depredations. It feeds upon the pastures by the river-side; and as it is very timorous, the instant it hears the least noise, it plunges into the stream. They are greatly sought after by the natives, as their flesh is considered as a delicacy, and thought by some not inferior to beef.

* **New Species of Tapir.**—M. G. Cuvier lately made a report to the Academy of Sciences of France, on the memoir of Dr Roulin, having for its object the natural history of the tapir, and particularly that of a new species of that genus, which the author has discovered in the high regions of the Cordilleras of the Andes. The new tapir, according to Cuvier, has a much greater resemblance to the Palæotherium than to any of the two species formerly known. The memoir, besides having added to the catalogue of animals a large quadruped, belonging to a genus which for a long time contained but a single species, throws light upon a fact which relates to the history of the antediluvian animals; for it had even been advanced by some authors, that a genus of these animals, the mastodon, probably still exists in the higher valleys of the Cordilleras.—Arcana of Science, 1830.

M. Roulin has lately discovered a second species of South American tapir, making the third species of the genus.

During several months' journey along the course of the Andes, the attention of M. Roulin appears to have been drawn towards the probability of discovering a peculiar species of tapir in the lofty regions of the mountains, by the vague yet universal reports of the native Indians and Spanish settlers, who confound under the title of *pinchaque* (phantom or spectre), at least two animals either real or imaginary; one of which M. Roulin believes to be his new species of tapir; and the other, it is surmised by Cuvier, may possibly prove to be the mastodon, if that gigantic link between the fossil and the recent world be indeed still in existence.

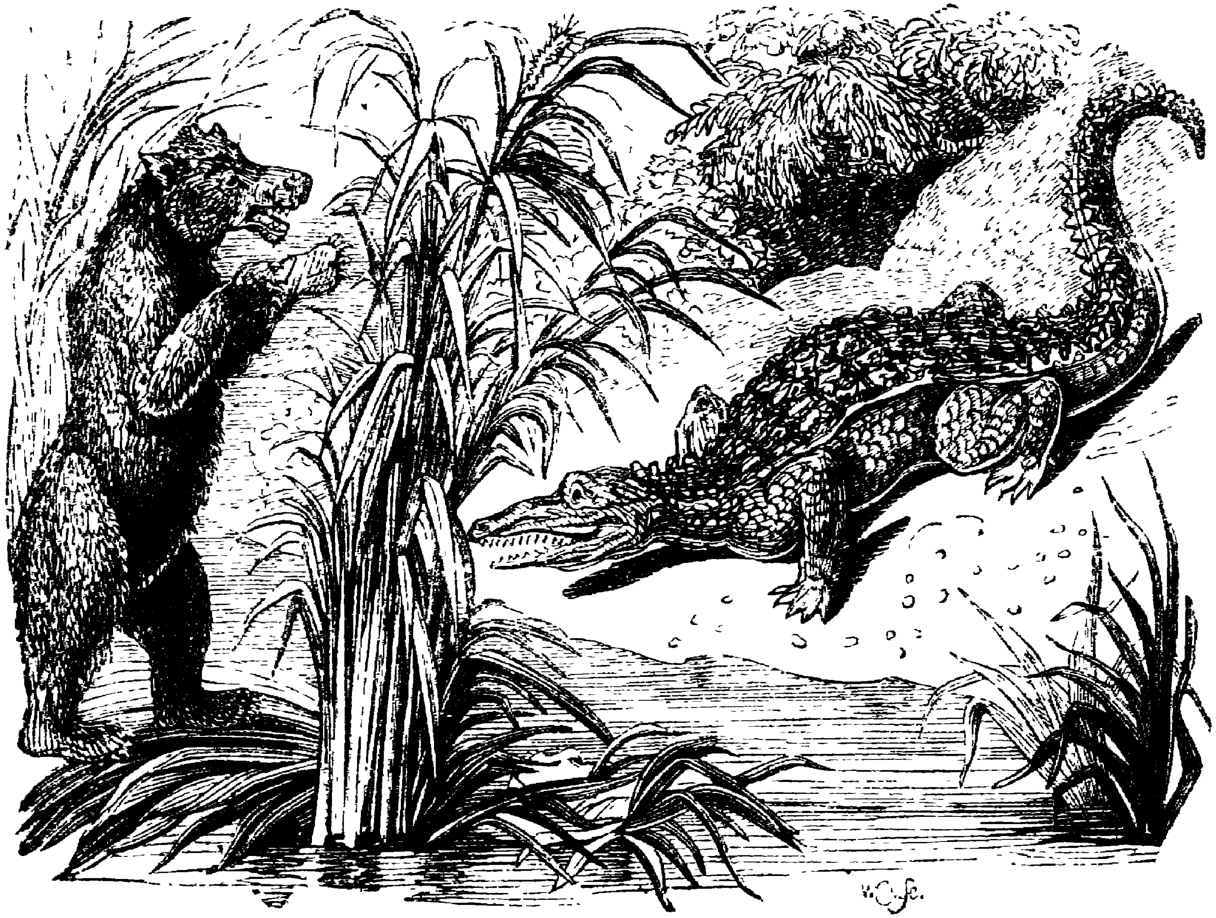
It was, however, in the province of Mariquita that our author was led more especially to seek for the living representative of the half-fabulous pinchaque; and he pursued his inquiries with the greater hope of success, as many of the ancient Spanish chroniclers, particularly Oviedo and P. de Agueda have mentioned the existence of a tapir of a brownish black colour, and furnished with thick hair, which has been considered as an erroneous description. The accounts of these old writers were, however, confirmed by the modern natives, particularly the Cargueros, who inhabit the valley of Cauca, &c., at the foot of the Paramo de Quindiu: these people informing the traveller, that a large species of tapir, answering to the description of Oviedo, inhabited the forests which skirt the eastern declivities of the Cordilleras, in the province of Mariquita, 500 or 600 mètres above the plains; the ordinary species being found only upon the latter, and in the valleys.

At the village of Bagota, M. Roulin had the gratification of seeing two specimens of the long-sought animal, which had been killed on the Paramo de Suma Paz, a mountain more elevated than that of Quindiu; and he afterwards was fortunate enough to obtain a head, which being conveyed to Paris, has been subjected to the inspection of Baron Cuvier. The examination of this great zootomist has revealed a very anomalous and unexpected fact, namely that the cranium of the new species approaches much more nearly in characters to that of the Indian, than of the previously known American tapir, and still more closely to that of the Palæotherium, an extinct genus, the remains of which are found in the tertiary beds of the Paris basin. Attached to his memoir, M. Roulin has presented figures of the crania, and thus enumerates their similitudes and differences:—The principal resemblances between the skulls of the new species and of the Sumatran tapir, consist in the general shape of the forehead, the defect of the projection of the parietal crest, the dimension of the nasal bones, and finally the form of the lower jaw, the inferior margin of which is straight, (in the Cayenne or South American species, it is strongly curved.) The differences between the cranium of this animal, and of the Palæotherium, are principally remarked in the forehead and nasal bones, which are more depressed in the former; and in the lower jaw, the posterior angle of which is more obtuse; the teeth are smaller, and the grinders do not so closely approach the canines.

The principal external peculiarity which distinguishes the new tapir from both its congeners, is one that is strictly accordant with its locality in the temperate, or rather cold altitudes of the lofty mountain range which it inhabits. The body is entirely covered with long hair, of a blackish brown colour, darker at the points than at the roots; whereas the other species, which fully share the high temperature of a tropical climate, are almost bare of fur. Its size is inferior to the others; the largest of the specimens seen at Bagota, measuring in length, from the muzzle to the point of the tail, only 5 feet 6½ inches; and in height, at the shoulders, 2 feet 9 inches. The head differs from that of the common species of South America, not only in its general outline, but in its details: the muzzle varies a little in its form, and the proboscis does not present upon its sides those ridges which indicate a habitual contraction of that organ. On the chin is situated a white patch, which is prolonged from the angle of the mouth, and includes nearly half the upper lip. The ear is deficient of the white margin; and the remarkably erect crest, which in the ordinary American species commences above the eyes, and is continued, like a hogged mane, along the ridge of the neck to the withers, is also wanting; the neck being perfectly round, and the hair with which it is covered of the same length as, and lying in a direction similar to, that of the rest of the animal. On each side of the crupper is situated a large, naked, but not callous spot, about twice the size of the palm of the hand. Above the division of the toes the fetlock is margined with a narrow white band, as in the common American tapir. On this species its describer has bestowed the name of *Tapir Pinchaque;* thus identifying it with the traditionary histories of the natives of its habitat; and, under that denomination, Cuvier has given it a place in the new edition of the *Regne Animal;* but neither that able systematist, nor its discoverer, has furnished it with a Latin specific appellation.—Arcana of Science, 1833.

Origin of the Griffin.—M. Roulin, in the memoir on the tapir, just quoted, offers the following explanation of the origin of the griffin of the Greeks.

The Greeks who trafficed across the Black Sea, came in contact with the Scythians, and they, on their part, traded with the Argipeans, a Tartar people, with long chins, flat noses, and shaved heads, who inhabited the valleys at the foot of the Ural Mountains, the rich mines of which, no doubt, formed a constant theme of intelligence from the Scythians to the Greeks. In those early and superstitious ages every treasure was supposed to possess its peculiar guardian; and from obvious motives of policy, such warders were chosen as would appear not less redoubtable in their power than repulsively frightful in their appearance; and hence arose the compound images of the winged serpent, the dragon, and the griffin, with the beak of an eagle, and the claws of a lion. This last figure, our author conceives, was originally the guardian monster of the treasures of the Ural



ALLIGATOR ATTACKING A BEAR.

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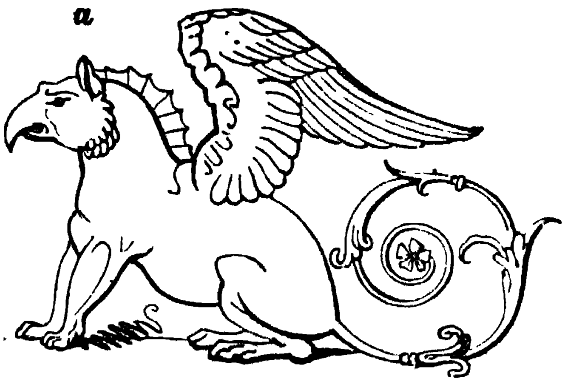
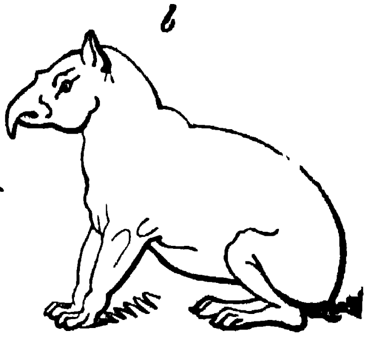




Mountains, the Cordilleras of the Argipeans, and that its representation and its fabulous history, were conveyed to the Grecians by the intervention of the Scythians, mingled with the traditions respecting the richness of the gold mines, in a manner conformable with the spirit of the times.

This animal, as it is evident by the illustrations of M. Roulin's memoir, which we have copied, possesses, in its general outline, a close resemblance to the tapir in a sitting attitude (*b*); and that learned naturalist thus accounts for its possession of the various addenda of wings, crest, and tail:—It is evident, says he, that the original image of the griffin, when introduced into Greece, was destitute of wings; as Herodotus, the oldest author who describes it, does not mention them, and his very important silence upon that point, is a sufficient proof of the fact. But the more ancient dragons of the caverns of Greece, were nearly all furnished with those members; and, therefore, upon the introduction of a new monster, it would naturally appear requisite, according to the preconceived notions of the people, to add them to its figure; and it was no very great stretch of imagination to accord the wings of an eagle to an animal which seemed already to possess its head; for the proboscis of the tapir, when bent down in its usual position, bears no little similitude to the beak of that bird.

The sculptors, who considered the griffin in a picturesque point of view, employing it in their arabesque ornaments, again contributed to alter its original form. To bestow additional gracefulness to its neck, they surmounted it with a mane like that which decked their horses; making the hairs short, straight, and erect; or it is not impossible that they might, in reality, have retained the genuine mane of the tapir. Afterwards, to render still more fantastic a being which was already intermediate between a quadruped and a bird, they converted this crest into the likeness of the dorsal fin of a fish.

The division of the toes of the tapir caused, with the Greeks, the same error as with the Chinese in the fabrication of their mé; and accordingly, they substituted for them those of a lion. As to the tail, it was almost certain that they would attempt to supply that appendage; and whilst some merely gave to the animal one conformable with its feet, others, desiring to make the figure wholly imaginary, bestowed upon it a spiral scroll, and ornamented it with the leaves of the acanthus.—Arcana of Science, 1833.

CHAP. XXXII.

THE RACOON.

(The Racoon.)

The racoon, which some authors have called the Jamaica rat, is about the size of a small badger; its body is short and bulky; its fur is fine, long, and thick, blackish at the surface, and grey towards the bottom; the nose is rather shorter, and more pointed than that of a fox; the eyes large and yellow, the teeth resembling those of a dog, the tail thick, but tapering towards a point, regularly marked with rings of black, and at least as long as the body; the fore feet are much shorter than the hinder, both armed with five sharp claws, with which, and his teeth, the animal makes a vigorous resistance. Like the squirrel it makes use of its paws to hold its food while eating; but it differs from the monkey kind, which use but one hand on those occasions, whereas the racoon and the squirrel use both, as wanting the thumb, their paws singly are unfit for grasping or holding. Though this animal be short and bulky, it is, however, very active; its pointed claws enable it to climb trees with greater facility; it runs on the trunk with the same swiftness that it moves upon the plain, and sports among the most extreme branches with great agility, security, and ease; it moves forward chiefly by bounding, and though it proceeds in the oblique direction, it has speed enough most frequently to escape its pursuers.

This animal is a native of the southern parts of America, nor have any travellers mentioned its being found in the ancient continent. But in the climates of which it is a native, it is found in noxious abundance, particularly in Jamaica, where it keeps in the mountains, and where it often descends to feed upon the plantations of sugar-cane. The planters of these climates consider these animals as one of their greatest miseries; they have contrived various methods of destroying them, yet still they propagate in such numbers that neither traps nor fire-arms can set them free; so that a swarm of these famished creatures are found to do more injury in a single night than the labours of a month can repair.

But though when wild they are thus troublesome, in a state of tameness no animal is more harmless or amusing; they are capable of being instructed in various little amusing tricks. The racoon is playful and cleanly, and is very easily supported; it eats of every thing that is given it, and if left to itself, no cat can be a better provider; it examines every corner, eats of all flesh, either boiled or raw, eggs, fruits or corn, insects themselves cannot escape it, and if left at liberty in a garden, it will feed upon snails, worms, and beetles; but it has a particular fondness for sweets of every kind, and to be possessed of these in its wild state, it incurs every danger. Though it will eat its provisions dry, it will for choice dip them in water if it happens to be in the way: it has one peculiarity which few other animals have been found to possess, it drinks as well by lapping, like the dog, as by sucking like the horse.

CHAP. XXXIII.

THE COATIMONDI.*

The first peculiarity with which this animal strikes the spectator, is the extreme length of its snout, which in some measure resembles that of the hog, but elongated to a surprising degree; it bears some distant resemblance to the animal last described, except that the neck and the body are longer, the fur shorter, and the eyes smaller; but its principal distinction, as was said before, consists in the shape of its nose, the upper jaw being an inch longer than the lower, and the snout, which is movable in every division, turning up at the end. Like the racoon, it sits up on the hinder legs with great ease, and in this position, with both paws, carries the food to its mouth.

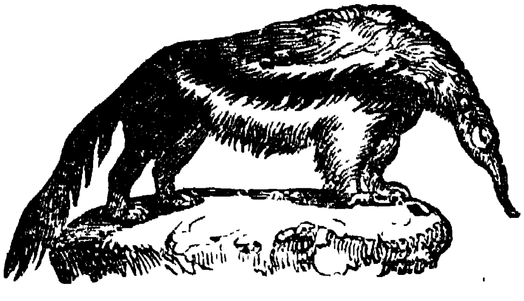
This animal is very subject to eat its own tail, which is rather longer than its body, but this strange appetite is not peculiar to the coati alone; the mococo, and some of the monkey kinds do the same, and seem to feel no pain in wounding a part of the body so remote from the centre of circulation.

It seems possessed of the same playful qualities and indiscriminate appetites, with the animal described in the last chapter; if left at liberty in a state of tameness, it will pursue the poultry, and destroy every living thing that it has strength to conquer: though it is playful with its keeper, yet it seems obstinately bent against receiving any instruction, and neither threats nor caresses can induce it to practise any arts to which it is not naturally inclined. When it sleeps, it rolls itself up in a lump, and in that position often continues for fourteen or fifteen hours together.

CHAP. XXXIV.

THE ANT-BEAR.

There are many animals that live upon ants in Africa and America: the pangolin or scaly lizard of Guinea may be considered among this number; but there are a greater variety in America which makes those minute insects their only subsistence. Though they are of different figures and sizes, yet in general they go under one common name of the ant bear; the peculiar length and slenderness of their snout, their singular appetites, and their manner of taking their prey, striking us too strongly to attend to the minute differences of their size or form



(The Ant-Bear.)

They have been classed by Buffon into the larger Tamandua, the smaller Tamandua, and the Ant-eater. The longest of this kind is four feet long, from the tip of the snout to the insertion of the tail; their legs are short and armed with four strong claws; their tail is long and tufted, and the animal often throws it on its back like the squirrel. The second of this kind is not above eighteen inches long, the tail is without hair, and it sweeps the ground as the animal moves. The ant-eater, which is the third variety, is still smaller than either o.

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* The Coatimondi is one of the weasel tribe, and is now known by the name of the Brazilian weasel.

the former, as it is not above seven inches from the tip of the snout to the insertion of the tail. The two former are of a brown, dusky colour, but this of a beautiful reddish, mixed with yellow; though they differ in figure, they all resemble each other in one peculiarity, which is the extreme slenderness of their snout, and the amazing length of their tongue.*

The snout is produced in so disproportionate a manner, that the length of it makes near a fourth part of the whole figure. A horse has one of the longest heads of any animal we know, and yet the ant-bear has one above twice as long in proportion to its body. The snout of this animal is almost round and cylindrical; it is extremely slender, and is scarce thicker near the eyes than at its extremity. The mouth is very small, the nostrils are very close to each other, the eyes are little in proportion to the length of the nose, the neck is short, the tongue is extremely long, slender, and flatted on both sides; this it keeps generally doubled up in the mouth, and is the only instrument by which it finds subsistence; for the whole of this tribe are entirely without teeth, and find safety only in the remoteness and security of their retreat.

If we examine through the various regions of the earth, we shall find that all the most active, sprightly, and useful quadrupeds have been gathered round man, and either served his pleasures, or still maintained their independence by their vigilance, their cunning, or their industry. It is in the remote solitudes that we are to look for the helpless, the deformed, and the monstrous births of Nature. These wretched animals, being incapable of defending themselves either by their agility or their natural arms, fall a prey to every creature that attacks them; they, therefore, retire for safety into the darkest forests, or the most desert mountains, where none of the bolder or swifter animals choose to reside.

It may well be supposed that an animal so helpless as the ant-bear is, with legs too short to fit it for flight, and unprovided with teeth to give it power of resistance, is neither numerous nor often seen: its retreats are in the most barren and uncultivated parts of South America. It is a native only of the new continent, and entirely unknown to the old. It lives chiefly in the woods, and hides itself under the fallen leaves. It seldom ventures from its retreat; and the industry of an hour supplies it with sufficient food for several days together. Its manner of procuring its prey is one of the most singular in all natural history. As its name implies, it lives entirely upon ants and insects; these, in the countries where it is bred, are found in the greatest abundance, and often build themselves hills, five or six feet high, where they live in community. When this animal approaches an ant-hill, it creeps slowly forward on its belly, taking every precaution to keep itself concealed, till it comes within a proper distance of the place where it intends to make its banquet; there lying closely along at its length, it thrusts forth its round, red tongue, which is often two feet long, across the path of these busy insects, and there lets it lie motionless for several minutes together. The ants of that country, some of which are half an inch long, considering it as a piece of flesh accidentally thrown before them, come forth and swarm upon it in great numbers; but wherever they touch, they stick: for this instrument is covered with a slimy fluid, which, like bird-lime, entangles every creature that lights upon it. When, therefore, the ant-bear has found a sufficient number for one morsel, it instantly draws in the tongue, and devours them all in a moment; after which it still continues in its position, practising the same arts until its hunger is entirely appeased; it then retires to its hiding-place once more, where it continues in indolent existence till again excited by the calls of hunger.

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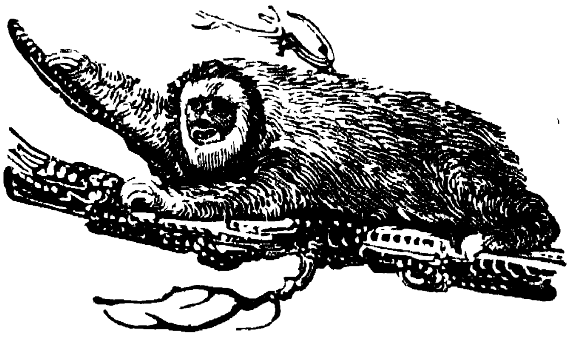
* **Ant-Bear**—On November 22, 1831, a letter from Sir R Ker Porter, Corr. Memb. Zoological Society, dated City of Caracas, Sept. 10, 1831, was read. It contained a detailed description of the *Myrmecophaga jubata*, Linn., under the name of *Orso Hormeguero*, or ant-bear, together with an account of the habits of that animal; and was accompanied by a drawing of the fully grown individual from whom the description was taken. Sir R. Ker Porter was particularly struck with the difference in structure which exists between the fore and the hinder feet, and with the curious disposition of the parts of the former in the act of progression, which has been slightly referred to by D Azara. In the figure (in which the animal is represented in a standing position) the claws of the fore feet do not project in front, but are doubled backwards under the wrist; evidencing a mode of progression in the *Myrmecophagæ* similar to that recently described by Col. Sykes as existing in the species of *Manis*. "To receive the additional length and point of the middle toe," observes Sir R. Ker Porter, "a protruding mass of hard flesh stood out from the wrist, wherein was a cavity destined for the reception of the ungulated elongation when the animal was in a standing position." He adds, "from the awkward formation of the fore feet, quickness of motion becomes impossible; hence they may be caught in the smallest open space (when seen) with little difficulty."—Arcana of Science, 1833.

Such is the luxurious life of a creature that seems of all others the most helpless and deformed. It finds safety in its hiding-place from its enemies, and an ample supply in some neighbouring ant-hill, for all its appetites. As it only tries to avoid its pursuers, it is seldom discovered by them; yet, helpless as this animal is, when driven to an extremity, though without teeth, it will fight with its claws with great obstinacy. With these arms alone, it has often been found to oppose the dog, and even the jaguar. It throws itself upon its back, fastens upon its enemy with all its claws, sticks with great strength and perseverance, and even after killing its invader, which is sometimes the case, does not quit its hold, but remains fastened upon him in vindictive desperation.[*]

CHAP. XXXV.

THE SLOTH.[†]



(The Sloth.)

Of the Sloth there are two different kinds, distinguished from each other by their claws; the one, which in its native country is called the Unau, having only two claws upon each foot, and being without a tail: the other, which is called the Ai, having a tail, and three claws upon each foot. The unau has the snout longer, the ears more apparent, and the fur very different from the other. It differs also in the number of its ribs; this having forty-six, while the ai has but twenty-eight. These differences, however, which though very apparent, have been but little regarded in the description of two animals which so strongly resemble each other in the general outlines of their figure, in their appetites, and their helpless formation.

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[*] THE ANT-EATERS.—Besides the animal here described, there are others of the same kind; the most remarkable of which are the Little Ant-eater of New Holland and the Prickly Ant-eater of New Holland. The former is singular for its having only two toes on the fore feet, armed with strong claws, and a tail which it is able to coil round the branches of trees and hold fast by. The whole animal is clothed in a beautiful, soft, curled, pale yellow fur. It is a native of Guinea. The prickly ant-eater is a short rounded animal, with a long, tubular mouth, and entirely covered over on the upper parts with strong sharp spines, resembling those of the porcupine.

[†] THE TARDIGRADE, OR SLOW-PACED FAMILY.—Naturalists express their pity for the animals of the tardigrade or slow footed family. Whilst other quadrupeds, they say, range in boundless wilds, the sloth hangs suspended by his strong arms—a poor ill-formed creature, deficient as well as deformed,

his hind legs too short, and his hair like withered grass; his looks, motions, and cries, conspire to excite pity; and, as if this were not enough, they say that his moaning makes the tiger relent and turn away. This is not a true picture: the sloth cannot walk like quadrupeds, but he stretches out his strong arms, and if he can hook on his claws to the inequalities of the ground, he drags himself along. This is the condition which authorizes such an expression as "the bungled and faulty composition of the sloth" But when he reaches the branch or the rough bark of a tree his progress is rapid; he climbs hand over head along the branches till they touch, and thus from bough to bough, and from tree to tree: he is most alive in the storm; and when the wind blows and the trees stoop and the branches wave and meet, he is then upon the march.

The compassion expressed by these philosophers for animals which they consider imperfectly organized, is uncalled for; as well might they pity the larva of the summer fly which creeps in the bottom of a pool because it cannot yet rise upon the wing. As the insect has no impulse to fly until the metamorphosis is perfect and the wings developed, so we have no reason to suppose that a disposition or instinct is given to animals where there is no corresponding provision for motion.

The sloth may move tardily on the ground, his long arms and his preposterous claws may be an incumbrance, but they are of advantage in his natural place among the branches of trees, in obtaining his food and in giving him shelter and safety from his enemies.

We must not estimate the slow motions of animals by our own sensations. The motion of the bill of the swallow or the fly-catcher in catching a fly is so rapid that we do not see it, but only hear the snap On the contrary, how very different are the means given to the chameleon for obtaining his food; he lies more still than the dead leaf, his skin is like the bark of the tree and takes the hue of surrounding objects. Whilst other animals have excitement conforming to their rapid motions, the shrivelled face of the chameleon hardly indicates life; the eyelids are scarcely parted; he protrudes his tongue with a motion so imperceptible towards the insect that it is touched and caught more certainly than by the most lively action. Thus, various creatures living upon insects reach their prey by different means and instincts; rapidity of motion which gives no time for escape is bestowed on some, while others have a languid and slow movement that excites no alarm.

Buffon, speaking of the extinct species of the tardigrade family, considers them as monsters by defect of organization;—as attempts of nature in which she has failed to perfect her plan;—that she has produced animals which must have lived miserably, and which are effaced as failures from the list of living beings. The Baron Cuvier does not express himself more favourably when he says of the existing species that they have so little resemblance to the organization of animals generally, and their structure is so much in contrast with that of other creatures, that he could believe them to be the remnants of an order unsuitable to the present system of nature; and if we are to look for their congeners it must be in the interior of the earth, in the ruins of the ancient world.

The animals of the antediluvian world were not monsters; there was no lusus or extravagance. Hideous as they appear to us, and, like the phantoms of a dream, they were adapted to the condition of the earth when they existed. I could have wished that our naturalists had given the inhabitants of that early condition of the globe names less scholastic. We have the plesiosaurus and plesiosaurus dolichodeirus; we have the ichthyosaurus and megalosaurus, and iguanodon, pterodactyles, with long and short beaks, tortoises, and crocodiles; and these are found among reeds and grasses of gigantic proportions, algæ, and fuci, and a great variety of mollusca of inordinate bulk, compared with those of the present day, as ammonites and nautili. Every thing declares that these animals inhabited shallow seas and estuaries or great inland lakes; that the surface of the earth did not rise up in peaks and mountains, or that perpendicular rocks bound in the seas, but that it was flat, slimy, and covered with a loaded and foggy atmosphere. There is, indeed, every reason to believe that the classes mammalia and birds were not then created; and that if man had been placed in this condition of the earth there must have been around him a state of things unsuited to his constitution and not calculated to call forth his capacities.

But, looking to the class of animals as we have enumerated them, there is a correspondence: they were scaly; they swam in water or crept upon the margins; there were no animals possessed of rapidity of motion, and no birds of prey to stoop upon them; there was, in short, that balance of the power of destruction and self-preservation which we see now to obtain in higher animals since created with infinitely varied instincts and powers for defence or attack —Sir Charles Bell Bridgewater Treatises.

They are both, therefore, described under the common appellation of the sloth, and their habitudes well deserve our wonder and curiosity. Nature seems cramped and constrained in their formation; other animals are often indolent from choice, these are slow from necessity.* The ai, from which I shall take my description, and from which the other differs only in the slight particulars above-mentioned, and in being rather more active, is of about the size of a badger. Its fur is coarse and staring, somewhat resembling dried grass; the tail very short and scarce appearing; the mouth extending from ear to ear; the eye dull and heavy; the feet armed with three claws each, and made so short, and set on so awkwardly, that a few paces is often the journey of a week; but though the feet are short, they are still longer than its legs, and these proceed from the body in such an oblique direction that the sole of the foot seldom touches the ground. When the animal, therefore, is compelled to make a step forward, it scrapes on the back of the nails along the surface, and wheeling the limbs circularly about, yet still touching the ground, it at length places its foot in a progressive position: the other three limbs are all brought about with the same difficulty; and thus it is seen to move not above three feet in an hour. In fact, this poor creature seldom changes place but by constraint, and when impelled by the severest stings of hunger.

The sloth seems to be the meanest and most ill-formed of all those animals that chew the cud: it lives entirely upon vegetable food, on the leaves, the fruit, and the flowers of trees, and often even on the very bark, when nothing else is left on the tree for its subsistence. Like all other ruminant animals it has four stomachs; and these requiring a large share of provision to supply them, it generally strips a tree of all its verdure in less than a fortnight. Still, however, it keeps aloft, unwilling to descend while anything remains that can serve it for food; it, therefore, falls to devouring the bark, and thus in a short time kills the tree upon which it found its support. Thus destitute of provisions above, and crawling slowly from branch to branch in hopes of finding something still left, it is at last obliged to encounter all the dangers that attend it below. Though it is formed by nature for climbing a tree with great pain and difficulty, yet it is utterly unable to descend: it, therefore, is obliged to drop from the branches to the ground, and as it is incapable of exerting itself to break the violence of its descent, it drops like a shapeless, heavy mass, and feels no small shock in the fall. There, after remaining some time torpid, it prepares for a journey to some neighbouring tree; but this of all migrations is the most tedious, dangerous, and painful; it often takes a week in crawling to a tree not fifty yards distant; it moves with imperceptible slowness, and often baits by the way. All motions seem to torture it; every step it takes it sets forth a most plaintive, melancholy cry, which, from some distant similitude to the human voice, excites a kind of disgust mixed with pity. This plaintive sound seems its chief defence; few quadrupeds appear willing to interrupt its progress, either that the flesh is offensive or that they are terrified at its cries. When at length they reach their destined tree, they mount it with much greater ease than when they moved upon the plain. They fall to with famished appetite, and, as before, destroy the very source that supplies them.*

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* THE SLOTH.—This singular animal is destined by nature to be produced, to live, and to die in the trees; and to do justice to him, naturalists must examine him in this his upper element. He is a scarce and solitary animal, and, being good food, he is never allowed to escape. He inhabits remote and gloomy forests where snakes take up their abode, and where cruelly stinging ants, and scorpions, and swamps, and innumerable thorny shrubs and bushes, obstruct the steps of civilized man. Were you to draw your own conclusions from the descriptions which have been given of the sloth, you would probably suspect that no naturalist has actually gone into the wilds with the fixed determination to find him out and examine his haunts, and see whether nature has committed any blunder in the formation of this extraordinary animal, which appears to us so forlorn and miserable, so ill put together, and so totally unfit to enjoy the blessings which have been so bountifully given to the rest of animated nature; for, as it has formerly been remarked, he has no soles to his feet, and he is evidently ill at ease when he strives to move on the ground, and it is then that he looks up in your face with a countenance that seems to say—"Have pity on me, for I am in pain and sorrow!"—WANDERINGS IN SOUTH AMERICA.

How far these may be considered as the unfinished productions of nature, I will not take upon me to determine: if we measure their happiness by our sensations, nothing, it is certain, can be more miserable; but it is probable, considered with regard to themselves, they may have some stores of comfort unknown to us, which may set them upon a level with some other inferior ranks of the creation; if a part of their life be exposed to pain and labour, it is compensated by a larger portion of plenty, indolence, and safety. In fact, they are formed very differently from all other quadrupeds, and it is probable they have different enjoyments. Like birds they have but one common vent for the purposes of propagation, excrement, and urine. Like the tortoise, which they resemble in the slowness of their motion, they continue to live some time after their nobler parts are wounded, or even taken away. They bear the marks of all those homely-formed animals that, like rude machines, are not easily discomposed.

Its note,(*g*) according to Kircher, is an ascending and descending hexachord, which it utters only by night; its look is so piteous as to move compassion; it is also accompanied with tears, that dissuade everybody from injuring so wretched a being. Its abstinence from food is remarkably powerful: one that had fastened itself by its feet to a pole, and was so suspended across two beams, remained forty days without meat, drink, or sleep; the strength of its feet is so great that whatsoever it seizes on cannot possibly be freed from its claws. A dog was let loose at the above-mentioned animal, taken from the pole; after some time the sloth laid hold of the dog with its feet, and held him four days, till he perished with hunger.

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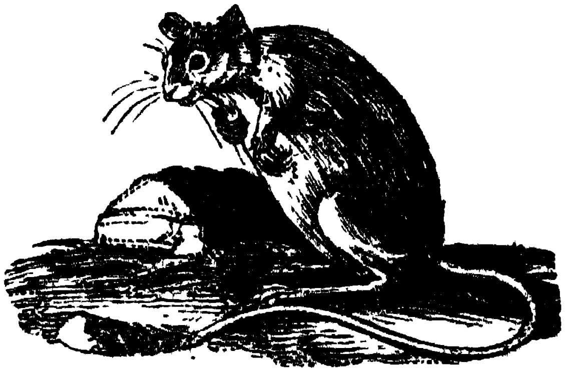
* HABITS OF THE SLOTH.—One day as we were crossing the Essequibo, I saw a large two-toed sloth on the ground upon the bank; how he had got there nobody could tell: the Indian said he had never surprised a sloth in such a situation before: he could hardly have come there to drink, for both above and below the place the branches of the trees touched the water, and afforded him an easy and safe access to it. Be this as it may, though the trees were not above twenty yards from him, he could not make his way through the sand time enough to escape before we landed. As soon as we got up to him, he threw himself upon his back, and defended himself in gallant style with his fore legs. "Come, poor fellow," said I to him, "if thou hast got into a hobble to-day thou shalt not suffer for it—I'll take no advantage of thee in misfortune." On saying this, I took up a long stick which was lying there, held it for him to hook on, and then conveyed him to a high and stately mora. He ascended with wonderful rapidity, and in about a minute he was almost at the top of the tree. He now went off in a side direction, and caught hold of the branch of a neighbouring tree; he then proceeded towards the heart of the forest. I stood looking on lost in amazement at his singular mode of progress.—WATERTON'S WANDERINGS.

(*g*) Pennant's Synopsis.

CHAP. XXXVI.

THE JERBOA.



(The Jerboa.)

This animal as little resembles a quadruped as that which has been described in a former chapter.* If we should suppose a bird divested of its feathers, and walking upon its legs, it might give us some idea of its figure. It has four feet, indeed, but in running or resting it never makes use of any but the hinder. The number of legs, however do not much contribute to any animal's speed; and the jerboa, though properly, speaking, furnished but with two, is one of the swiftest creatures in the world.

The jerboa is not above the size of a large rat, and its head is sloped somewhat in the manner of a rabbit; the teeth, also, are formed like those of the rat kind, there being two cutting teeth in each jaw; it has a very long tail, tufted at the end; the head, the back, and sides are covered with large, ash-coloured, soft hair; the breast and belly are whitish; but what most deserves our attention, in the formation of this little animal, is the legs; the fore legs are not an inch long, with four claws and a thumb upon each, while the hinder legs are two inches and a quarter, and exactly resemble those of a bird, there being but three toes, the middlemost of which is longest.

The jerboa is found in Egpyt, Barbary, Palestine, and the deserts between Busserah and Aleppo: its hind legs, as was said before, are only used in running, while the fore paws, like those of a squirrel, grasp its food, and in some measure perform the office of hands. It is often seen by travellers as they pass along the deserts, crossing their way, and jumping six or eight feet at every bound, and going so swiftly that scarce any other quadruped is able to overtake them. They are a lively, harmless race of animals, living entirely upon vegetables, and burrowing like rabbits in the ground. Pennant tells us of two that were lately brought to London, that burrowed almost through the brick wall of the room where they were kept: they came out of their hole at night for food, and, when caught, were much fatter and sleeker than when confined to their burrows. A variety of this animal is found also in Siberia and Circassia, and is, most probably, common enough over all Asia. They are more expert diggers than even the rabbit itself; and when pursued for a long time, if they cannot escape by their swiftness, they try to make a hole instantly in the ground, in which they often bury themselves deep enough to find security before their pursuers come up. Their burrows in some places are so thick as to be dangerous to travellers, the horses perpetually falling into them. It is a provident little animal, and lays up for the winter. It cuts grass in heaps of a foot square, which when dried it carries into its burrow, therewith to serve it for food, or to keep its young warm during the rigours of the winter.

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* **The Genus Jerboa.**—This genus approximates considerably to the rat, properly so called, by a great number of characters of internal organization, but is sufficiently distinguished by the shortness of the anterior limbs and the length of the hinder extremities. As to the external conformation, the jerboas exhibit some relations with the kangaroos. The form of the body is the same in general. The hinder limbs are likewise five or six times stronger than the fore. In both genera the tail is very long; the ears elongated and pointed, and the eyes very large and round. But though the kangaroos have so many traits of external conformation similar to the jerboas, they are infinitely removed from them in most important points, such as the organs of generation, ventral pouch, &c. The genus jerboa is now composed of several distinct species, one of which is extremely abundant in Barbary, in Higher and Lower Egypt, and Syria, and again in the more northern climates, situated between the Tanais and the Volga; the other occupying an immense space in Siberia and the north part of Russia, from Syria to the Eastern Ocean, and as far as the northern parts of Hindostan.—Cuvier.

But of all animals of this kind, that which was first discovered and described by Sir Joseph Banks is the most extraordinary. He calls it the kangaroo; and though from its general outline, and the most striking peculiarities of its figure, it greatly resembles the jerboa, yet it entirely differs, if we consider its size, or those minute distinctions which direct the makers of systems in assorting the general ranks of nature.[*]

The largest of the jerboa kind which are to be found in the ancient continent do not exceed the size of a rabbit. The kangaroo of New Holland, where it is only to be found, is often known to weigh above sixty pounds, and must consequently be as large as a sheep. Although the skin of that which was stuffed and brought home by Sir Joseph Banks was not much above the size of a hare, yet it was greatly superior to any of the jerboa kind that have been hitherto known, and very different in many particulars. The snout of the jerboa, as has been said, is short and round, that of the new-discovered animal long and slender: the teeth also entirely differ; for, as the jerboa has but two cutting teeth in each jaw, making four in all, this animal, besides its cutting teeth, has four canine teeth also. But what makes a more striking peculiarity, is the formation of its lower jaw, which, as the ingenious discoverer supposes, is divided into two parts, which open and shut like a pair of scissors, and cut grass, probably this animal's principal food. The head, neck, and shoulders are very small in proportion to the other parts of the body; the tail is nearly as long as the body, thick near the rump, and tapering towards the end; the skin is covered with a short fur, excepting the head and the ears, which bear a slight resemblance to those of the hare. We are not told, however, from the formation of its stomach, to what class of qnadrupeds it belongs. From its eating grass, which it has been seen to do, one would be apt to rank it among the ruminant animals; but from the canine teeth which it is found to have, we may on the other hand suppose it to bear some relation to the carnivorous. Upon the whole, however, it can be classed with none more properly than with animals of the jerboa kind, as its hind legs are so much longer than the fore: it moves, also, precisely in the same manner, taking great bounds of ten or twelve feet at a time, and thus sometimes escaping even the fleetest greyhound with which Sir Joseph Banks pursued it. One of them that was killed proved to be good food; a second, which weighed eighty-four pounds, and was not yet come to its full growth, was found to be much inferior.*

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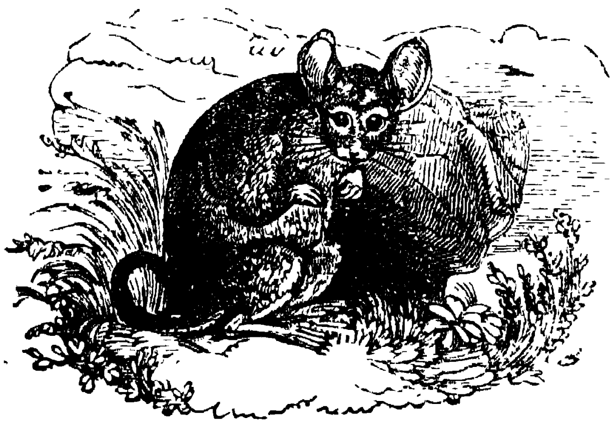
[*] THE GIGANTIC KANGAROO.—Buffon, whose only errors were those of genus, clearly perceived that every continent, in its animal productions, presented the appearance of an especial creation; but he gave a universality to this proposition of which it is not altogether susceptible. It is, nevertheless, true, even at the present day, within certain limits. A great number of the Asiatic animals are not found in Africa, and *vice versâ*. The lemurs seem only to exist in Madagascar. America is peopled with a host of mammalia exclusively peculiar to itself; and there are many more in Europe, not to be found in any quarters of the globe. The discovery of Australasia has given an additional support to this opinion of Buffon. The species of animals there discovered have not only no affinity with those of the other continents, but, in fact, belong for the most part to genera altogether different. Such are those mammalia which the natives of New Holland call kangaroo; and which offer to the observation of the naturalist organic peculiarities, perceivable in no other animal, with the exception of one single species. It is in this tribe that, for the first time, we view the singular phenomenon of an animal using its tail as a third hind leg in standing upright and in walking.

With this last described and last discovered animal I shall conclude the history of quadrupeds, which of all parts of natural knowledge seems to have been described the most accurately. As these, from their figure as well as their sagacity, bear the nearest resemblance to man, and from their uses or enmities are the most respectable parts of the inferior creation, so it was his interest and his pleasure to make himself acquainted with their history. It is probable, therefore, that time, which enlarges the sphere of our knowledge in other parts of learning, can add but very little to this. The addition of a new quadruped to the catalogue already known is of no small consequence, and happens but seldom; for the number of all is so few, that wherever a new one is found it becomes an object worthy our best attention.†



(The Chinchilla.)

* **The Chinchilla.**—An animal somewhat resembling the jerboa, but which has not yet been classified by naturalists, is the chinchilla. Notwithstanding the extensive traffic carried on in the skins of this animal, little was correctly known regarding it until 1830. "The earliest account of the chinchilla with which we have met is contained in Father Joseph Acosta's Natural and Moral History of the East and West Indies, published at Barcelona, in Spanish, in the year 1591. 'The chinchilles,' says he, 'is another kind of small beasts like squirrels: they have a wonderful smoothe and soft skinne, which they weare as a healthful thing to comfort the stomacke and those parts that have need of a moderate heat: they make coverings and rugges of the haire of these chinchilles, which are found in the Sierre of Peru.'

"The chinchilla is a woolly field-mouse which lives under ground, and chiefly feeds on wild onions. Its fine fur is well known in Europe; that which comes from Upper Peru is rougher and larger than the chinchilla of Chile, but not always so beautiful in its colour. Great numbers of these animals are caught in the neighbourhood of Coquimbo and Copiapo, generally by boys with dogs, and sold to traders who bring them to Santiago and Valparaiso, from whence they are exported. The Peruvian skins are either brought to Buenos Ayres from the eastern parts of the Andes, or sent to Lima. The extensive use of this fur has lately occasioned a very considerable destruction of the animals."—**Schmidtmeyer's Travels into Chile.** 1824.

Individual of this Species.—An individual of this interesting species was lately presented by Lady Knighton to the collection of the Zoological Society. When the new comer was first introduced into Bruton Street, it was placed in the same cage with a former specimen; but the latter appeared by no means disposed to submit to the presence of the intruder. A ferocious kind of scuffling fight immediately ensued between them, and the latter would unquestionably have fallen a victim, had it not been rescued from its impending fate. Since that time they have inhabited separate cages, placed side by side; and although the open wires would admit of some little familiarity taking place between them, no advances have been made on either side.

† **Agency of Man in Extinguishing and Spreading the Species.**—Let us make some inquiries into the extent of the influence which the progress of society has exerted, during the last seven or eight centuries, in altering the distribution of our indigenous British animals. Dr. Fleming has prosecuted this inquiry with his usual zeal and ability, and in a memoir on the subject has enumerated the best authenticated examples of the decrease or extirpation of certain species during a period when our population has made the most rapid advances. We shall offer a brief outline of his results.

The stag, as well as the fallow-deer and the roe, were formerly so abundant that, according to Lesley, from five hundred to a thousand were sometimes slain at a hunting-match; but the native races would already have been extinguished, had they not been carefully preserved in certain forests. The otter, the marten, and the polecat, were also in sufficient numbers to be pursued for the sake of their fur; but they have now been reduced within very narrow bounds. The wild cat and fox have also been sacrificed throughout the greater part of the country, for the security of the poultry-yard or the fold. Badgers have been expelled from nearly every district which at former periods they inhabited.

Besides these, which have been driven out from some haunts, and everywhere reduced in number, there are some which have been wholly extirpated; such as the ancient breed of indigenous horses, the wild boar and the wild oxen, of which last, however, a few remains are still preserved in the parks of some of our nobility. The beaver, which was eagerly sought after for its fur, had become scarce at the close of the ninth century, and, by the twelfth century, was only to be met with, according to Giraldus de Barri, in one river in Wales and another in Scotland. The wolf, once so much dreaded by our ancestors, is said to have maintained its ground in Ireland so late as the beginning of the eighteenth century (1710), though it had been extirpated in Scotland thirty years before, and in England at a much earlier period. The bear, which in Wales was regarded as a beast of the chase equal to the hare or the boar, only perished as a native of Scotland in the year 1057.

Many native birds of prey have also been the subjects of unremitting persecution. The eagles, larger hawks, and ravens, have disappeared from the more cultivated districts. The haunts of the mallard, the snipe, the redshank, and the bittern, have been drained equally with the summer dwellings of the lapwing and the curlew. But these species still linger in some portion of the British isles; whereas the large capercailzies, or wood grouse, formerly natives of the pine forests of Ireland and Scotland, have been destroyed within the last fifty years. The egret and the crane, which appear to have been formerly very common in Scotland, are now only occasional visitants. The bustard (*Otis tarda*), observes Graves in his British Ornithology, "was formerly seen in the downs and heaths of various parts of our island, in flocks of forty or fifty birds; whereas it is now a circumstance of rare occurrence to meet with a single individual." Bewick also remarks, "that they were formerly more common in this island than at present; they are now found only in the open counties of the south and east, in the plains of Wiltshire, Dorsetshire, and some parts of Yorkshire." In the few years that have elapsed since Bewick wrote, this bird has entirely disappeared from Wiltshire and Dorsetshire.

These changes, we may observe, are derived from very imperfect memorials, and relate only to the larger and more conspicuous animals inhabiting a small spot on the globe; but they cannot fail to exalt our conception of the enormous revolutions which, in the course of several thousand years, the whole human species must have effected.

The kangaroo and the emu are retreating rapidly before the progress of colonization in Australia; and it scarcely admits of doubt that the general cultivation of that country must lead to the extirpation of both. The most striking example of the loss, even within the last two centuries, of a remarkable species, is that of the dodo—a bird first seen by the Dutch when they landed on the Isle of France, at that time uninhabited, immediately after the discovery of the passage to the East Indies by the Cape of Good Hope. It was of a large size and singular form; its wings short, like those of an ostrich, and wholly incapable of sustaining its heavy body even for a short flight. In its general appearance it differed from the ostrich, cassowary, or any known bird.

Many naturalists gave figures of the dodo after the commencement of the seventeenth century; and there is a painting of it in the British Museum, which is said to have been taken from a living individual. Beneath the painting is a leg, in a fine state of preservation, which ornithologists are agreed cannot belong to any other known bird. In the museum at Oxford, also, there is a foot and a head in an imperfect state; but M. Cuvier doubts the identity of this species with that of which the painting is preserved in London.

In spite of the most active search, during the last century, no information respecting the dodo was obtained, and some authors have gone so far as to pretend that it never existed; but amongst a great mass of satisfactory evidence in favour of the recent existence of this species, we may mention that an assemblage of fossil bones were recently discovered, under a bed of lava, in the Isle of France, and sent to the Paris museum by M. Desjardins. They almost all belonged to a large living species of land tortoise, called *Testudo Indica*, but amongst them were the head, sternum, and humerus of the dodo. M. Cuvier showed me these valuable remains in Paris, and assured me that they left no doubt in his mind that the huge bird was one of the gallinaceous tribe.

Next to the direct agency of man, his indirect influence in multiplying the numbers of large herbivorous quadrupeds of domesticated races may be regarded as one of the most obviate causes of the extermination of species. On this, and on several other grounds, the introduction of the horse, ox. and other mammalia, into America, and their rapid propagation over that continent within the last three centuries, is a fact of great importance in natural history. The extraordinary herds of wild cattle and horses which overran the plains of South America sprang from a very few pairs first carried over by the Spaniards; and they prove that the wide geographical range of large species in great continents does not necessarily imply that they have existed there from remote periods. Humboldt observes, in his Travels, on the authority of Azara, that it is believed there exist, in the Pampas of Buenos Ayres, twelve million cows and three million horses, without comprising in this enumeration the cattle that have no acknowledged proprietor. In the Llanos of Caraccas, the rich hateros, or proprietors of pastoral farms, are entirely ignorant of the number of cattle they possess. The young are branded with a mark peculiar to each herd, and some of the most wealthy owners mark as many as fourteen thousand a year. In the northern plains, from the Orinoco to the lake of Maracaybo, M. Depons reckoned that one million two hundred thousand oxen, one hundred and eighty thousand horses, and ninety thousand mules, wandered at large. In some parts of the valley of the Mississippi, especially in the country of the Osage Indians, wild horses are immensely numerous.

The establishment of black cattle in America dates from Columbus's second voyage to St Domingo. They there multiplied rapidly; and that island presently became a kind of nursery from which these animals were successively transported to various parts of the continental coast, and from thence into the interior. Notwithstanding these numerous exportations, in twenty-seven years after the discovery of the island, herds of four thousand head, as we learn from Oviedo, were not uncommon, and there were even some that amounted to eight thousand. In 1587 the number of hides exported from St. Domingo alone, according to Acosta's report, was thirty-five thousand four hundred and forty-four; and in the same year there were exported sixty-four thousand three hundred and fifty from the ports of New Spain. This was in the sixty-fifth year after the taking of Mexico, previous to which event the Spaniards, who came into that country, had not been able to engage in anything else than war. All our readers are aware that these animals are now established throughout the American continent, from Canada to Paraguay

The ass has thriven very generally in the New World; and we learn from Ulloa, that in Quito they ran wild, and multiplied in amazing numbers, so as to become a nuisance. They grazed together in herds, and, when attacked, defended themselves with their mouths. If a horse happened to stray into the places where they fed, they all fell upon him, and did not cease biting and kicking till they left him dead.

The first hogs were carried to America by Columbus, and established in the island of St. Domingo the year following its discovery in November 1493. In succeeding years they were introduced into other places where the Spaniards settled; and, in the space of half a century, they were found established in the New World, from the latitude of 25 deg. north, to the 40th deg. of south latitude. Sheep, also, and goats have multiplied enormously in the New World, as have also the cat and the rat, which last, as we before stated, has been imported unintentionally in ships. The dogs introduced by man, which have at different periods become wild in America, hunted in packs like the wolf and the jackal, destroying not only hogs, but the calves and foals of the wild cattle and horses.

Ulloa in his voyage, and Buffon on the authority of old writers, relate a fact which illustrates very clearly the principle before explained by us, of the check which the increase of one animal necessarily offers to that of another. The Spaniards had introduced goats into the island of Juan Fernandez, where they became so prolific as to furnish the pirates who infested those seas with provisions. In order to cut off this resource from the buccaneers, a number of dogs were turned loose into the island; and so numerous did they become in their turn, that they destroyed the goats in every accessible part, after which the number of the wild dogs again decreased.

As an example of the rapidity with which a large tract may become peopled by the offspring of a single pair of quadrupeds, we may mention that, in the year 1773, thirteen reindeer were exported from Norway, only three of which reached Iceland. These were turned loose into the mountains of Guldbringe Syssel, where they multiplied so greatly in the course of forty years, that it was not uncommon to meet with herds consisting of from forty to one hundred in various districts.—Lyell's Geology, vol. ii.

Superstitions, Fables, &c., relative to Animals.—A superstition prevails both in England and Scotland (Qu. Are Wales and Ireland excepted?) that goats are never to be seen for twenty-four hours together, owing to their paying Satan a visit once during that period to have their beards combed; indeed, since the classical representations of Pan and the satyrs, from whose semi-brutal figures we derive our own superstitious idea of the form of the evil one, goats, rams, and pongos have shared with serpents and cats the obloquy of being in a manner his animal symbols. The offensive smell of this animal is thus accounted for by the natives of South Guinea:—

Having requested a female deity to allow them to use an aromatic ointment which she used, the enraged goddess rubbed them with one of a very different description, and the smell of this has been ever since retained by the descendants of the presumptuous offenders.

We may here remark, that of late years some doubts have arisen, and not without foundation, respecting the wholesomeness of goats' milk, hitherto believed to be, in many respects, superior even to that of the cow. The goat was much venerated by the ancient Egyptians, and never sacrificed, because Pan was represented with the legs and feet of that animal; but the Greeks destroyed it on account of its cropping the vines.

Few animals have been the cause, perhaps, of so many superstitions as the common domestic cat; most of them are too well known to require repetition here, but the still prevalent popular prejudice that this creature sucks the breath of sleepers, especially children, and thereby kills them, has been signally refuted by modern naturalists, who observe that, even if it were capable of drawing a person's breath thus, the construction of its mouth renders it impossible to impede the respiration of the slumberer through mouth and nostrils at the same time; this vulgar superstition probably arose from cats liking to lie warm, and nestling consequently in beds, cribs, and cradles. To dream of cats is considered unlucky, denoting treachery and quarrels on the part of friends. Cats, from no apparent cause, seeming shy, agitated, and traversing the house uttering cries, as if alarmed, is believed to forbode sudden and causeless strife between the members of the families with whom they reside. That the breath of these animals is poisonous, that they can play with serpents and remain uninjured, whilst their fur communicates the infection of the venom of those reptiles, that they lend themselves readily to infernal agents and purposes, that certain portions of their bodies possess magical properties and were efficacious in the preparation of charmed potions, and that they are partly supernatural creatures, endowed with a power of bringing good or evil fortune upon their possessors, with other facts just as credible, was once devoutly believed by the illiterate, as it is partially at this very day.

Dogs are generally supposed to possess the faculty of beholding spirits when they are invisible to mortals, and of foretelling death by lamentable howls. It is lucky to be followed by a strange dog. The Welsh believe in the apparition of certain spirits under the form of hunting dogs, which they call dogs of the sky (cwn wybir, or cwn aunwy); they indicate the death of a relation or friend of the person to whom they appear, but, though generally accompanied by fire, are innocuous. The tradition of the spectre hound of Peel Castle (Isle of Man), or Manthe doog, is well known. The religious superstition of Mahommedans leads them to consider the dog as an unclean animal; but the dog of the Seven Sleepers, according to a tale in the Koran, is, say the faithful, the only animal admitted into heaven. A more sweet and soothing creed is held by "the untutored Indian," who believes that the faithful companion of his laborious mortal career will accompany him into the everlasting regions; and, indeed, the idea that animals possess actually an inferior soul, and that, maltreated as they are on earth, they too have their appropriate heaven, has by many been considered a speculation less superstitious than truly philosophical.

The miraculous circumstance of Balaam's ass being empowered to behold that startling apparition which his rider's eyes were holden so that he could not see, may have originated the superstition that animals behold spirits when they are invisible to man. Horses, from frequently starting at no apparent cause, have thus been placed amongst the seers. In the Highlands it is deemed lucky to meet a horse; but, according to Virgil, the sight of one of these animals was ominous of war, the reason for which may be found in a horse being as a martial animal dedicated to the god of war. The Persians, Armenians, and other ancient nations sacrificed horses to the sun. Tacitus says the Suevi maintained white horses in the several woods at the public charge to draw omens from them; and there are to this day vestiges in England of some superstition relative to white horses, and of supposed Danish origin.

The hyæna has been the subject of strange fables: its neck was supposed to be jointless, consisting but of one bone, and considered of great efficacy in magical preparations; and the Arabs to this day, when they kill this fierce animal, bury its head, lest it should be made the element of some charm against them. It was believed to possess the power of changing its sex annually; to be able to fascinate shepherds by its eyes and render them motionless; and its cognomen, "laughing," is, of course, derived from the idea of its being able to imitate the human voice.

The ancients believed that if a man encountered a wolf, and the animal first fixed its eyes upon him, he was deprived for ever of the power of speech: connected with these ferocious brutes is the fearful superstition of the lycanthropos, were-wulf, loup-garou, or man-wolf. "These were-wolves," says Verstegan, "are certain sorcerers who, having anointed their bodies with an ointment they make by the instinct of the devil, and putting on a certain enchanted girdle, do not only unto the view of others seem as wolves. but to their own thinking have both the shape and nature of wolves so long as they wear the said girdle; and they do dispose themselves as very wolves, in worrying, and killing, and waste of human creatures" The Germans had a similar superstition regarding wolves, and the same respecting the wild boar; and with these let us compare the British belief, that warlocks and weird women possess the power of transforming themselves into hares, cats, &c.

Swine, which are strangely uneasy in or against tempestuous weather, are believed to see the wind. In some parts of Great Britain it is a popular belief that, on commencing a journey, if a sow and pigs be met it will prove successful; but if a sow only crosses the road, the traveller, if he cannot pass, must ride round about it, otherwise ill luck will attend him.

The fore foot of a hare, worn constantly in the pocket, is esteemed by certain worthy old dames as a sure preventive of rheumatic disorders.

The lynx was believed by the ancients, from the acuteness of its sight, to have the power of seeing through stone walls; and amongst other absurdities then gravely maintained were these:—that the elephant had no joints, and being unable to lie down, was obliged to sleep leaning against a tree; that deer lived several hundred years; that the badger had the legs of one side shorter than those of the other; that the chameleon lived entirely on air, and the salamander in fire; whilst the sphynx, satyr, unicorn, centaur, hypogriff, hydra, dragon, griffin, cockatrice, &c. &c. &c., were either the creations of fancy, or fabled accounts of creatures of whose real form, origin, nature, and qualities, but the most imperfect knowledge was afloat.

The flesh of the rhinoceros, and almost every part of its body, is reckoned by the ignorant natives of countries where it is found an antidote against poison.

That the jackal is the "lion's provider," entirely, is an erroneous idea; but it is true that the terrific cry of this animal, when in chase, rouses the lion, whose ear is dull, and enables him to join in the pursuit of prey. Many stories are told respecting the generosity of the lion; and it was once confidently believed that no stress of hunger would induce him to devour a virgin,* though his imperial appetite might satiate itself on men and matrons. The title of King of the Beasts, given at a period when strength and ferocity were deemed the prime qualities of man, is now more justly considered to belong to the mild, majestic, and almost rational elephant. The white elephant is a sacred animal with the Siamese, and the cow with the Bramins and Hindoos.

The bear was believed never to devour a man whom it found dead; and it was imagined to lick its cubs into proper shape: hence the expression, "unlicked cub," applied to a raw, awkward, unpolished youth. The saliva of the llama, which when angry it ejects, has been erroneously supposed to possess a corrosive quality.

The hoof of the moose-deer was formerly in great repute for curing epilepsies, but has now justly fallen into neglect. The Laplander, commencing his journey, whispers into the ear of the rein-deer, believing these animals understand and will obey his oral directions. The elk is accounted by the Indians an animal of good omen, and often to dream of him indicates a long life. They imagine also the existence of a gigantic elk, which walks without difficulty in eight feet of snow, has an arm growing from its shoulder which it uses as we do, is invulnerable to all weapons, is king of the elks, and attended by a numerous herd of courtiers. The fur of the glutton is so valued by the Kamtschatdales that they say celestial beings are clad in no other.

It was long a popular error that the porcupine, when irritated, discharged its quills at its adversary; that these quills were poisonous, and rendered wounds inflicted by them difficult to cure: a better acquaintance with the natural history of this harmless animal has now exploded these fables. Our British porcupine, the innocuous hedgehog, has long been the object of unceasing persecution, from the popular belief that it bites and sucks the udders of cows, an absurdity sufficiently contradicted by the smallness of its mouth. In like manner, the goatsucker is a persecuted bird, since, as its name implies, it has been thought to suck the teats of goats and other animals: whereas the form of its bill entirely precludes such an act, and it is an inoffensive bird, living upon insects. The superstition has probably originated from its being often found in warm climates under cattle, capturing the insects that torment them. It is supposed, in some places, that the shrew-mouse is of so baneful and deleterious a nature that whenever it creeps over a beast, cow, sheep, or horse (in particular), the animal is afflicted with cruel anguish, and threatened with the loss of the use of its limb. A shrew-ash was the remedy for this misfortune, viz. an ash whose twigs or branches gently applied to the affected members relieved the pain: our provident forefathers, anticipating such an accident to their cattle, always kept a shrew-ash at hand, which, once medicated, retained its virtue for ever: it was thus prepared: into the body of an ash a deep hole was bored with an auger, and a poor devoted shrew-mouse being thrust into it, the orifice was plugged up, probably with quaint incantations now forgotten.

The toad, owing to its hideous, disgusting appearance, has been the subject of many superstitions: it is commonly thought to spit venom, whilst, as yet, the question is unsettled, whether or not it be poisonous in any respect; some affirm that a viscous humour of poisonous quality exudes from the skin, like perspiration; whilst others pretend that cancers may be cured by the application of living toads to them; and a man has been known to swallow one of these abominations for a wager, taking care, however, to follow this horrid meal by an immediate and copious draught of oil. But the very glance of the toad has been supposed fatal; of its entrails fancied poisonous potions have been concocted; and for magical purposes it was believed extremely efficacious; a precious stone was asserted to be found in its head, invaluable in medicine and magic. In Carthagena and Portobello (America) these creatures swarm to such a degree in wet weather that many of the inhabitants believe every drop of rain to be converted into a toad. It is said of the Pipa, or Surinam toad, a hideous, but probably harmless, animal, that very malignant effects are experienced from it when calcined.

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* 'Tis said the lion will turn and flee
From a maid in the pride of her purity.—BYRON.

The crocodile is feigned to weep and groan like a human being in pain and distress, in order to excite the sympathy of man, and thus allure him into his tremendous jaws.

The lizard, though now declared by naturalists to be perfectly harmless, was long considered poisonous by the ignorant; and, in Sweden and Kamtschatka, the green lizard is the subject of strange superstitions, and regarded with horror. Newts, efts, swifts, snakes, and blindworms are, in popular credence, all venomous; and that the ear-wig most justly derives its name from entering people's ears, and either causing deafness, or, by penetrating to the brain, death itself, is with many considered an indisputable fact. The Irish have a large beetle of which strange tales are believed; they term it the coffin-cutter, and it has some connexion with the grave and purgatory, not now, unfortunately, to be recalled to our memory.

It is, in Germany, a popular belief that the stag-beetle (perhaps the same insect) carries burning coals into houses by means of its jaws, and that it has thus occasioned many dreadful fires. The death-watch superstition is too well-known to need particular notice. It is singular that the house-cricket should by some persons be considered an unlucky, by others, a lucky, inmate of the mansion: those who hold the latter opinion consider its destruction the means of bringing misfortune on their habitations. "In Dumfries-shire," says Sir William Jardine, "it is a common superstition that if crickets forsake a house which they have long inhabited, some evil will befall the family; generally the death of some member is portended. In like manner the presence or return of this cheerful little insect is lucky, and portends some good to the family.

The following curious notice of the *Acherontia Atropos*, or death's-head moth, we extract from the Journal of a Naturalist:—"The yellow and brown-tailed moths," he observes, "the death-watch, our snails, and many other insects, have all been the subjects of man's fears, but the dread excited in England by the appearance, noises, or increase of insects, are petty apprehensions compared with the horror that the presence of this acherontia occasions to some of the more fanciful and superstitious natives of northern Europe, maintainers of the wildest conceptions. A letter is now before me from a correspondent in German Poland, where this insect is a common creature, and so abounded in 1824, that my informant collected fifty of them in a potato-field of his village, where they call them the 'death's-head phantom,' the 'wandering death-bird,' &c. The markings on the back represent to their fertile imaginations the head of a perfect skeleton, with the limb bones crossed beneath; its cry becomes the voice of anguish, the moaning of a child, the signal of grief; it is regarded, not as the creation of a benevolent being, but as the device of evil spirits—spirits, enemies to man, conceived and fabricated in the dark; and the very shining of its eyes is supposed to represent the fiery element whence it is thought to have proceeded. Flying into their apartments in an evening, it at times extinguishes the light, foretelling war, pestilence, famine, and death to man and beast. * * This insect has been thought to be peculiarly gifted in having a voice and squeaking like a mouse when handled or disturbed; but, in truth, no insect that we know of has the requisite organs to produce a genuine voice; they emit sounds by other means, probably all external."

The Icelanders believe seals to be the offspring of Pharaoh and his host; who, they assert, were changed into these animals when overwhelmed in the Red Sea. The grampus, porpoise, and dolphin have each from the earliest ages been the subject of numerous superstitions and fables, particularly the latter, which was believed to have a great attachment to the human race, and to succour them in accidents by sea; it is a perfectly straight fish, yet even painters have promulgated a falsity respecting it, by representing it from the curved form in which it appears above water, bent like the letter S reversed. "The inhabitants of Pesquaré," says Dr. Belon, "and of the borders of Lake Gourd, are firmly persuaded that the carp of those lakes are nourished with pure gold; and a great portion of the people in the Lyonnois are fully satisfied that the fish called humble and emblons eat no other food than gold. There is not a peasant in the environs of the Lake of Bourgil who will not maintain that the laurets, a fish sold daily in Lyons, feed on pure gold alone. The same is the belief of the people of the Lake Paladron in Savoy, and of those near Lodi. But," adds the Doctor, "having carefully examined the stomachs of these several fishes, I have found that they lived on other substances, and that from the anatomy of the stomach it is impossible that they should be able to digest gold." This fable, therefore, with that of the chameleon living on air only, and some others which we shall have occasion to mention, may be regarded amongst those exploded by science.

The fable of the kraken has been referred to imperfect and exaggerated accounts of monstrous polypi infesting the northern seas; how far may not the cuttle-fish have given rise to this fiction? In hot countries cuttle-fish are found of gigantic dimensions: the Indians affirm that some have been seen two fathoms broad over their centre; and each arm (for this kind is the eight-armed cuttle-fish) nine fathoms long! Lest these animals should fling their arms over the Indians' light canoes, and draw them and their owners into the sea, they fail not to be provided with an axe to chop them off.

The ancients believed that the oil of the grayling obliterated freckles and small-pox marks. The adhesive qualities of the remora, or sucking-fish, and its habit of darting against and fixing itself to the side of a vessel, caused the ancients to believe that the possessors of it had the power of arresting the progress of a ship in full sail.

Some Catholics, in consequence of the John Doree having a dark spot, like a finger-mark, on each side of the head, believe this to have been the fish, and not the haddock, from which the Apostle Peter took the tribute money, by order of our Saviour. The modern Greeks denominate it "the fish of St. Christopher," from a legend which relates that it was trodden on by that saint, when he bore his divine burden across an arm of the sea. Some species of echini, fossilized, and seen frequently in Norfolk, are termed by the ignorant peasantry, and considered, fairy loaves, to take which, when found, is highly unlucky.

The amphisbæna, from its faculty of moving backwards or forwards at pleasure, has been thought to have a head at either extremity of its reptile body, but close inspection proves this opinion false. The fascinating power of the rattlesnake, of which so many stories have in times past been related, and which was asserted to exist in its glittering eyes, has been of late years resolved into that extreme nervous terror of its victim (at sight of so certain a foe) which deprives it of the power of motion, and causes it to fall an unresisting prey into the reptile's jaws. We may here pause to observe, *en passant*, that the antipathy which people of all ages and nations have felt against every reptile of the serpent tribe, from the harmless worm to the hosts of deadly "dragons" which infest the torrid zone, and the popular opinion that all are venomous, often in spite of experience, seems to be not so much superstition, as a terror of the species, implanted, since the fall, in our bosoms, by the same Divine Being who at that period pronounced the serpent to be the most accursed beast of the field.

The oriental fable of the roc has its probable origin in the condor, which is undoubtedly the largest and strongest bird of the vulture tribe in existence, and extremely ravenous. Minerva's bird, the owl, is well known as one of ill omen; besides the superstitious idea that the screech-owl foretells death by its cry, it was formerly believed to suck the blood of children. The Mongol and Calmuc Tartars have held the white owl sacred since the days of Genghis Khan, when a bird of this species having settled on a bush in which that prince had hidden himself from his enemies, those who pursued him passed it, not believing that a bird would perch on a bush wherein a man was concealed. The raven has ever been considered by the vulgar as a bird of evil omen, the indicator of misfortunes and death; and, indeed, the superstition is but consonant with a bird of such funereal note and hue, and exhibiting such goule-like propensities. The Swedes, however, regard it as sacred, and no one offers to molest it. In the north of England, one magpie flying alone is deemed an ill omen; two together a fortunate one; three forebode a funeral, and four a wedding; or, when on a journey, to meet two magpies portends a wedding; three, a successful journey; four, unexpected good news; and five, that the person will soon be in company with the great. To kill a magpie, indicates or brings down some terrible misfortune. The sparrow-hawk was sacred with the Egyptians, and the symbol of Osiris. The yellow-hammer is superstitiously considered an agent in *diablerie*. The wheat-ear is, in the Highlands, a detested bird, and fancied one of evil omen, on account of its frequenting old churchyards, where it nestles amongst the stones, and finds plenty of insects for food. The woodcock is, we believe, the bird imagined to drop, in its proper season, from the moon. It is a vulgar error that the song of the nightingale is melancholy, and that it only sings by night; but to hear the cuckoo before the nightingale has been long deemed an unsuccessful omen in love: the saliva of the cuckoo has been thought to preserve all it falls upon.

> "The robin and the wren
> Are God Almighty's cock and hen."

says the old distich, and whilst it is reckoned wicked to kill either of these (not but that there is an ancient custom of "hunting the wren" still kept up, we believe, in some parts of this country), it is considered unlucky to kill a swallow, or house-martin. The kingfisher is the halcyon of the ancients, who imagined that during the process of incubation by the female the sea remained unvexed by storms;—hence "halcyon days." The feathers of this bird are employed by the

Tartars for many superstitious purposes; they consider them amulets of priceless value, enabling them to inspire women with love. In more civilized countries it was once believed, that, if the body of a kingfisher were suspended by a thread, some magnetic influence would turn its breast to the north: others thought it a preserver of woollen cloths from moths. The albatross (by some considered the kingfisher or halcyon) is fabled to sleep in the air, never to touch the earth; and to kill one is reckoned supremely unlucky. There is an Indian bird, the name of which has unfortunately escaped us, that is feigned to live only on the rain-drops which it can draw with its bill from the clouds; in a dry season, therefore, this bird perishes. Of the bird of paradise the following wonders were once credited: viz., that the egg was laid in the air by the female, and there hatched by the male in an orifice of his body; that it had no legs (these, however, are long, and a disfigurement to the body, which the Indians know, and, fearful of their depreciating the value of the bird, upon capturing it, cut them off); that it hung itself by the two long feathers of its tail on a tree when sleeping; that it never touched the ground during any period of its existence, and fed wholly on dew. The Indians also believe that the leader, or king of the birds of paradise, is black, with red spots, and that he soars far away from the rest of the flock—which, however, never quit him, but settle where he does. The gigantic crane is believed by the Indians to be invulnerable, and animated by the souls of deceased Brahmins; the Africans hold it in equal veneration. Whence arises the classical fable that swans sing their own dirge just previous to death, and expire singing it? The wild swan certainly may be said to whistle, but the tame has no other note than a hiss, and this only when provoked. The Kamtschatdales and Kuriles wear round their necks the bills of puffins, as an amulet which insures good fortune. Who was Mother Carey?—The wife, perhaps, of "Davy," and keeper of his "locker." Mother Carey's chickens is the well-known appellation, in *tarrish* tongue, of stormy petrels, not superstitiously supposed to forebode tempests, since they seem their very element; but it is probable that to Mother Carey herself (we crave her pardon—*Mistress*) some astounding "yarn" is attached. The stork, the crane, and the pelican, are each the subject of idle stories: the latter has been asserted to feed her young with her own bosom's blood, and to fill her pouch with water in order to supply them in the desert. A notion is entertained by the ignorant that the bittern thrusts its bill into a reed, which serves as a pipe to increase the volume of its natural note, and swell it above pitch; and in some places a tradition prevails that it thrusts its head into water and then blows with all its might. It is erroneous that the ostrich lays her eggs in the sand, depending solely on the sun's rays to hatch them; the truth is, that, as from the heat of her native climate it is not always necessary for her to sit upon them, she simply does what numerous birds in colder latitudes are well known to do—viz., cover them, that they may not, during her absence, lose their heat.

The popular opinion that the turtle dove, of either sex, should it happen to lose its mate, remains ever after in a state of disconsolate celibacy, is, we believe, disproved by the fact, at least as respects these birds in a wild state; but we may remark, that the loss of a companion to more than one kind of *domesticated* bird, if it has been brought up with one, even though not in the same cage, is sometimes so severely deplored by the survivor, as to occasion its death, if the loss be not speedily supplied. The old story of swallows passing the winter in a state of torpidity at the bottom of rivers, lakes, and ponds, has been frequently agitated, asserted to be a fact by one party, and totally disproved by the other. The reader may be amused to learn that very recently we were assured by one, who *knew it for an absolute fact*, that ducks and even chickens (!) had been found in a certain farmer's pond, laid up in winter quarters, which were revived by the warmth of the sun and upper air, upon being fished out of it! "Regarding birds' eggs," says the Naturalist in his interesting Journal, "we have a very foolish superstition here (Gloucestershire): the boys may take them unrestrained, but their mothers so dislike their being kept in the house, that they usually break them; their presence may be tolerated for a few days, but by the ensuing Sunday they are frequently destroyed, under the idea that they bring bad luck, or prevent the coming of good fortune, as if in some way offensive to the domestic deity of the hearth."—MIRROR, vol. xix.

END OF THE QUADRUPEDS.

A
HISTORY OF BIRDS.

CHAP. I.

OF BIRDS IN GENERAL.

We are now come to a beautiful and loquacious race of animals, that embellish our forests, amuse our walks, and exclude solitude from our most shady retirements. From these man has nothing to fear: their pleasures, their desires, and even their animosities, only serve to enliven the general picture of nature, and give harmony to meditation.

No part of nature appears destitute of inhabitants. The woods, the waters, the depths of the earth, have their respective tenants; while the yielding air; and those tracts of seeming space where man never can ascend, are also passed through by multitudes of the most beautiful beings of the creation.

Every order and rank of animals seems fitted for its situation in life; but none more apparently than birds; they share in common with the stronger race of quadrupeds the vegetable spoils of the earth, are supplied with swiftness to compensate for their want of force; and have a faculty of ascending into the air to avoid that power which they cannot oppose.

The bird seems formed entirely for a life of escape; and every part of the anatomy of the animal seems calculated for swiftness. As it is designed to rise upon air, all its parts are proportionably light, and expand a large surface without solidity.

In a comparative view with man, their formation seems much ruder and more imperfect; and they are in general found incapable of the docility even of quadrupeds. Indeed, what great degree of sagacity can be expected in animals whose eyes are almost as large as their brain? However, though they fall below quadrupeds in the scale of nature, and are less imitative of human endowments, yet they hold the next rank, and far surpass fishes and insects, both in the structure of their bodies and in their sagacity.

As to their external parts, they seem surprisingly adapted for swiftness of motion. The shape of their body is sharp before, to pierce and make way through the air; it then rises by a gentle swelling to its bulk, and falls off in an expansive tail that helps to keep it buoyant, while the fore parts are cleaving the air by their sharpness. From this conformation, they have often been compared to a ship making its way through water; the trunk of the body answers to the hold, the head to the prow, the tail to the rudder, and the wings to the oars; from whence the poets have adopted the metaphor of *remigium alarum*, when they describe the wavy motion of a bird in flight.*

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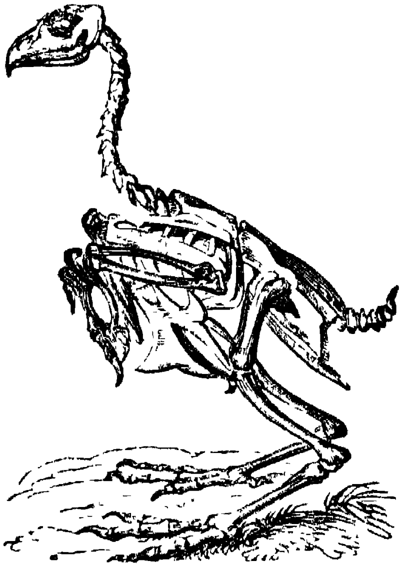
* **The Structure of Birds.**—Birds may be said to constitute an isolated class of beings. They are distinguished by certain characters from all other animals: their classification does not pass into any other, and cannot, therefore, be consistently introduced into the supposed chain or gradation of natural bodies.

The skeleton or bony frame of birds is in general lighter than in quadrupeds. They have the largest bones of all animals in proportion to their weight; and their bones are more hollow than those of animals that do not fly: air-vessels also enable them to blow out the hollow parts of their bodies, when they wish to make their descent slower, rise more swiftly, or float in the air. The spine is immovable, but the neck has a greater number of bones (never less than nine, and varying from that to twenty-four), and conse-

What we are called upon next to admire in the external formation of birds, is the neat position of the feathers, lying all one way, answering at once the purposes of warmth, speed, and security. They mostly tend backward, and are laid over one another in an exact and regular order, armed with warm and soft down next the body, and more strongly fortified and curiously closed externally, to fence off the injuries of the weather. But, lest the feathers should spoil by their violent attrition against the air, or imbibe the moisture of the atmosphere, the animal is furnished with a gland behind, containing a proper quantity of oil, which can be pressed out by the bird's bill, and laid smoothly over every feather that wants to be dressed for the occasion. This gland is situated on the rump, and furnished with an opening or excretory duct, about which grows a small tuft of feathers, somewhat like a painter's pencil. When, therefore, the feathers are shattered or rumpled, the bird, turning its head backwards, with the bill catches hold of the gland, and, pressing it, forces out the oily substance, with which it anoints the disjointed parts of the feathers; and, drawing them out with great assiduity, recomposes and places them in due order, by which they unite more closely together. Such poultry, however, as live for the most part under cover, are not furnished with so large a stock of this fluid as those birds that reside in the open air.* The feathers of a hen, for instance, are pervious to

quently of joints, and more varied motion, than in quadrupeds. The breast-bone is very large, with a prominent keel down the middle, and is formed for the attachment of very strong muscles: the bones of the wings are analogous to those of the fore legs in quadrupeds, but the termination is in three joints or fingers only, of which the exterior is very short. This will be better understood by the annexed



(Skeleton of a Turkey.)

The muscles that move the wings downwards, in many instances, are a sixth part of the weight of the whole body; whereas those of a man are not in proportion one hundredth part so large. The centre of gravity of their bodies is always below the insertion of their wings to prevent them falling on their backs, but near that point on which the body is, during flight, as it were, suspended. The positions assumed by the head and feet are frequently calculated to accomplish these ends, and give to the wings every assistance in continuing the progressive motion. The tail also is of great use, in regulating the rise and fall of birds, and even their lateral movements. What are commonly called the legs are analogous to the hind legs in quadrupeds, and they terminate, in general, in four toes, three of which are usually directed forwards, and one backwards; but in some birds there are only two toes, in others three.

Birds exceed quadrupeds in the quantity of their respiration, for they have not only a double circulation, and an aerial respiration, but they respire also through other cavities beside the lungs, the air penetrating through the whole body, and bathing the branches of the aorta, or great artery of the body, as well as those of the pulmonary artery.

Birds are usually classed according to the forms of their bills and feet, from those parts being connected with their mode of life, food, &c. and influencing their total habit very materially.— Mirror, vol. xix.

* Gland of the Rump.—The greater number of authors tell us that birds, and more particularly aquatic birds, dress their feathers with a peculiar oil furnished for this purpose by a gland on the rump; but this is an opinion which we shall presently see admits of considerable doubt. It may be well, however, to state the particulars of the common notion. "Upon the rump," says Willughby, "grow two glandules, designed for the preparation and secretion of a certain unctuous humour, and furnished with a hole or excretory vessel. About this hole grows a tuft of small feathers or hairs, somewhat like to a painter's pencil. When, therefore, the parts of the feathers are shattered, ruffled, or

every shower; on the contrary, swans, geese, ducks, and all such as nature has directed to live upon the water, have their feathers dressed with oil from the very first day of their leaving the shell.

Every external part of the bird race appears adapted to the life and situation of the animal; nor are the inward parts, though less immediately appropriated to flight, less necessary to safety. The bones of every part of the body are extremely light and thin; and all the muscles, except that immediately moving the wings, extremely slight and feeble. The tail, which is composed of quill feathers, serves to counterbalance the head and neck—it guides the animal's flight like a rudder, and greatly assists it either in its ascent or when descending.

any way discomposed, the bird, turning her head backward to her rump, with her bill catches hold of the fore-named tuft, and pressing the glandules, forces out the oily pap, and therewithal anointing the disjoined parts of the feathers, and drawing them out with her bill, recomposes and places them in due order, and causes them to stick faster together." "The glands which secrete the oil," says Blumenbach, "on the upper part of the tail, are largest in aquatic birds, in some of which, as the Muscovy duck (*Anas moschata*), the secreted substance has a musk-like odour." The statement just given from Willughby is adopted by most of the systematic writers, though a few of them take no notice whatever of the existence of the rump glands. "On the back," we are told by Linnæus, "or upper surface of the rump, there are two glands which secrete an oily fluid, with which the birds anoint their feathers." "The lower part of the back," says Dr. Latham, "is furnished with a double gland, secreting an oily fluid for the use of dressing the feathers."

The recent authors who adopt this opinion would appear, from their taking no notice of them, to be unacquainted with the observations of M. Reaumur, which we shall abstract. The glands on the rump, he remarks, secrete an unctuous fluid, discharged in some birds by one, and in others by two excretory canals. Poultry have but one of these canals, which consists of a conical fleshy pipe of a series of rings, placed almost perpendicularly to the rump; and when this gland is pressed by the fingers, the fluid, thickish in consistence, is seen to exude. But in a peculiar species of barn-door fowls, without tails, (*Gallus ecaudatus*, TEMMINCK,) originally it would appear from Ceylon, the tail, the rump, and the gland are all wanting, the part where these grow in other species being depressed and smooth.

Were an attempt made to assign a reason why these Ceylonese fowls have no unctuous gland on the rump, a mistake might as readily be committed as has, it would appear, been done in the theory framed to account for the use of the gland in birds which possess it. All the works of nature being lavishly filled with wonders, fitted to raise most just admiration of the Creator, those who, with very laudable intentions, undertake to exhibit these wonders, may be considered as in some degree blameable when they introduce into their enumeration circumstances that are vague and uncertain. Among such doubtful things appears to be the opinion that the feathers of birds require to be done over with a kind of oil or grease, in order to cause the rain or other water to run off without penetrating them, the unction, when wanted, being supplied by the gland on the rump. If those who adopt this opinion, plausible as it seems to be, had taken the trouble to ascertain the small quantity of fluid actually secreted by this gland from day to day, and compared it with the proportional extent of surface constituted by the assemblage of the numberless feathers of any particular bird, not to speak of the instrument with which the dressing is said to be effected, they would have seen at once that the theory is untenable, as the quantity secreted in one day would scarcely suffice to anoint a single feather, much less the whole. We have just squeezed out all the oil contained in the double rump gland of a common wren, and found it impossible to make it go over one of the tail feathers. "One fact," says M. Le Vaillant, "is frequently sufficient to demolish a theory;" and the fact that the feathers of the rumpless fowls which have no gland, are as smooth and proof against rain as those which possess the gland, furnishes a striking illustration of the remark.

The fact, however, is unquestionable that birds are sometimes seen pecking about the gland in question. But the observing of a bird thus engaged, so far from authorizing the received conclusion, might have shown that the point of the bill could never squeeze out enough of fluid for the purpose alleged. The only legitimate inference would have been, that some slight pain or irritation had caused the bird to peck the gland; and every school-boy knows that the canal of this gland often becomes obstructed in his pet birds, and occasions a troublesome and sometimes fatal engorgement.

The remark of Blumenbach that the gland is largest in aquatic birds, contains a generalization not warranted by facts; for grebes,

CHAP. II.

OF THE GENERATION, NESTLING, AND INCUBATION OF BIRDS.

THE return of spring is the beginning of pleasure. Those vital spirits which seemed locked up during the winter, then begin to expand; vegetables and insects supply abundance of food; and the bird having more than a sufficiency for its own subsistence, is impelled to transfuse life as well as to maintain it. Those warblings, which had been hushed during the colder seasons, now begin to animate the fields; every grove and bush resounds with the challenge of anger, or the call of allurement. This delighted concert of the grove, which is so much admired by man, is no way studied for his amusement: it is usually the call of the male to the female; his efforts to soothe her during the times of incubation: or it is a challenge between two males, for the affections of some common favourite.*

It is by this call that birds begin to pair at the approach of spring, and provide for the support of a future progeny. The loudest notes are usually from the male; while the hen seldom expresses her consent, but in a short, interrupted twittering. This compact, at least for the season, holds with unbroken faith: many birds live with inviolable fidelity together for a constancy; and when one

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divers, and such as want tails, have the gland much smaller, though their feathers are as smooth and as impenetrable by water as those of the terns and the gulls which have considerable tails.

It is only requisite, indeed, for any one to watch a bird preening its feathers, to be convinced of the fallacy of the theory. We have attended for hours to various species of birds when thus engaged; and so far from constantly returning to the rump-gland, which by the hypothesis would be indispensable for dressing every successive feather, it is rarely visited at all during the operation, and when it is, the sole object seems to be, to trim the pencil of feathers which surrounds the gland. Had we any doubts upon the subject, the simple experiment of covering the gland in one hen or duck, so as to prevent the bird having access to it, and leaving it uncovered in another, for a few days or weeks, would, by the state of the feathers in each, set the question at rest. Independently of such an experiment, common to all birds, the circumstance of the feathers on the head being equally trim, smooth, and glossy with those on the body, though they cannot be oiled, as it is impossible to reach the head with the bill—the only instrument by which the oil could be applied—is of itself fatal to the theory.

Should we be asked what we consider to be the use of the gland, we must at once say that we do not know; but our ignorance of its real use furnishes no support to the conjectural theory which the preceding facts prove to be erroneous.—HABITS OF BIRDS, *in the Library of Entertaining Knowledge*.

* SEASONAL CHANGES.—The birds that live constantly with us are the first of the animal creation which are influenced by seasonal changes. Many of them prepare for the business of nidification before others. The raven and common owl are usually leaders; then the rook, jackdaw, and redbreast. Crows, magpies, and jays are later. Among song-birds, the song-thrush, missel-thrush, and afterwards the blackbird, are among the early builders; but all these are much governed by situation: the inhabitants of a warm, extensive shrubbery of evergreens begin their social connexions much sooner than those located in the bleak forest. But our chief seasonal birds are the emigrants. The first is the chiff-chaff: this little bird is sometimes heard so early as the 8th of March. Along with it appears the whinchat and stonechat: the latter is supposed not to leave England entirely, but only shifts from one part of England to another. The redstart may be looked for about the 8th of April; the swallow on the 13th; cuckoo, nightingale, wryneck, blackcap, willow wren, petty-chaps, whitethroat, and lesser whitethroat, about the 20th; the house, sand, and black martens about the 25th; and the turtle-dove and flycatcher about the 30th. Many of our migratory birds arrive earlier, and remain about London for some time before they disperse themselves into the interior of the kingdom; but do not commence singing till they have chosen their nestling place.—ED.

dies, the other is always seen to share the same fate soon after. We must not take our idea of the conjugal fidelity of birds from observing the poultry in our yards, whose freedom is abridged, and whose manners are totally corrupted by slavery. We must look for it in our fields and our forests, where nature continues in unadulterated simplicity; where the number of males is generally equal to that of females; and where every little animal seems prouder of his progeny than pleased with his mate. Were it possible to compare sensations, the male of all wild birds seems as happy in the young brood as the female; and all his former caresses, all his soothing melodies, seem only aimed at that important occasion when they are both to become parents, and to educate a progeny of their own producing. The pleasures of love appear dull in their effects, when compared to the interval immediately after the exclusion of their young. They both seem, at that season, transported with pleasure; every action testifies their pride, their importance, and tender solicitude.*

When the business of fecundation is performed, the female then begins to lay. Such eggs as have been impregnated by the cock are prolific; and such as have not (for she lays often without any congress whatsoever) continue barren, and are only addled by incubation. Previous, however, to laying, the work of nestling becomes the common care; and this is performed with no small degree of assiduity and apparent design. It has been asserted that birds of one kind always make their nests in the same manner, and of the same materials; but the truth is, that they vary this as the materials, places, or climates happen to differ.† The redbreast, in some parts of England, makes its nest with oak leaves, where they are in greatest plenty; in other parts with moss and hair. Some birds, that with us make a very warm nest, are less solicitous in the tropical climates, where the heat of the weather promotes the business of incubation. In general, however, every species of birds has a peculiar architecture of its own; and this adapted to the number of eggs, the temperature of the climate, or the respective heat of the little animal's own body. Where the eggs are numerous, it is then incumbent to make the nest warm, that the animal heat may be equally diffused to them all. Thus the wren, and all the small birds, make the nest very warm; for having many eggs, it is requisite to distribute warmth to them in common: on the contrary, the plover that has but two eggs, the eagle, and the crow, are not so solicitous in this respect, as their bodies are capable of being applied to the small number upon which they sit. With regard to climate, water fowl that with us make but a very slovenly nest, are much more exact in this particular, in the colder regions of the north. They there take every precaution to make it warm; and some kinds strip the down from their breasts, to line it with greater security.*

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* Dr. Gall's Mode of Studying the Characters of Animals.—After presenting my letters of introduction to him at seven in the morning, he showed me into a room, the walls of which were covered with bird cages, and the floor with dogs and cats, &c. Observing that I was surprised at the number of his companions, he observed, "Ah you Englishmen take me for a bird-catcher. I am sure you feel surprised that I am not somewhat differently made to any of you, and that I should employ my time talking to birds. Birds, Sir, differ in their dispositions, like men; and if they were but of more consequence, the peculiarities of their characters would have been as well delineated. Do you think," said he, turning his eyes to two beautiful dogs at his feet, which were endeavouring to gain his attention, "do you think that these little pets possess pride and vanity like man?" "Yes," I said, "I have remarked their vanity frequently."—"We will call both feelings into action," said he. He then caressed the whelp, and took it into his arms. "Mark his mother's offended pride," said he, as she walked quietly across the chamber to her mat. "Do you think she will come if I call her?"—"O yes!" I answered.—"No, not at all." He made the attempt, but she heeded not the hand she had so earnestly endeavoured to lick but an instant before. "She will not speak to me to-day," said the doctor. He then described to me the peculiarities of many of his birds, and I was astonished to find that he seemed familiar also with their dispositions, (if I may be allowed the word.) "Do you think that a man's time would be wasted thus in England? You are a wealthy and powerful nation; and as long as the equilibrium exists between the two, so shall you remain but this never has existed, nor can, beyond a certain period. Such is your industry, stimulated by the love of gain, that your whole life is spun out before you are aware the wheel is turning; and so highly do you value commerce, that it stands in the place of self-knowledge, and an acquaintance with nature and her immense laboratory.—E. A. T. in Medical and Physical Journal.

† The Nests of Birds.—The construction and selected situation of birds' nests, are as remarkable as the variety of materials employed in them; the same forms, places, and articles being rarely, perhaps never, found united by the different species, which we should suppose similar necessities would direct to a uniform provision. Birds that build early in the spring, seem to require warmth and shelter for their young; and the blackbird and the thrush line their nests with a plaster of loam, perfectly excluding by these cottage-like walls, the keen icy gales of our opening year; yet should accident bereave the parents of their first hopes, they will construct another, even when summer is advanced, upon the model of their first erection, and with the same precautions against severe weather, when all necessity for such provision has ceased, and the usual temperature of the season rather requires coolness and a free circulation of air. The house-sparrow will commonly build four or five times a year, and in a variety of situations. The cradle for its young, whether under our tiles in March, or in July when the parent bird is panting in the common heat of the atmo-

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sphere, has the same provisions made to afford warmth to the brood; yet this is a bird that is little affected by any of the extremes of our climate. The wood-pigeon and the jay, though they erect their fabrics on the tall underwood in the open air, will construct them so slightly, and with such a scanty provision of materials, that they scarcely seem adequate to support their broods, and even their eggs may almost be seen through the loosely connected materials: but the goldfinch, that inimitable spinner, the Arachne of the grove, forms its cradle of fine mosses and lichens collected from the apple or pear tree, compact as felt, lining it with the down of thistles besides, till it is as warm as any texture of the kind can be, and it becomes a model for beautiful construction. The golden-crested wren, a minute creature perfectly unmindful of any severity in our winter, and which hatches its young in June, the warmer portion of our year, yet builds its most beautiful nest with the utmost attention to warmth; and in weaving small branches of moss with the web of the spider, forms a closely compacted texture nearly an inch in thickness, lining it with such a profusion of feathers, that sinking deep into the downy accumulation, it seems almost lost itself, when sitting; and the young when hatched, appear stifled with the warmth of their bedding and the heat of their apartment: while the white-throat, the blackcap, and others, which will hatch their young nearly at the same period, or in July, require nothing of the kind. The greenfinch places its nest in the hedge with little regard to concealment; its fabric is slovenly and rude, and the materials of the coarsest kinds; while the chaffinch just above it in the elm, hides its nest with cautious care, and moulds it with the utmost attention to order, neatness, and form. One bird must have a hole in the ground; another a crevice in the wall, or a chink in the tree is indispensable. Endless examples might be found of the dissimilarity of requirements in these constructions, among the several associates of our groves, our hedges, and our houses, and yet the supposition cannot be entertained for a moment, that they are superfluous, or not essential for some purpose, with which we are unacquainted. By how many of the ordinations of Supreme Intelligence is our ignorance made manifest? Even the fabrication of the nests of these little animals exceeds our comprehension; we know none of the causes or motives of that unembodied mind that willed them thus.
—JOURNAL OF A NATURALIST.

* ON THE BREEDING SPOTS OF BIRDS.—The learned editor of the interesting travels of M. Boie in Norway, considers it as indispensable, for the complete developement of the eggs, that they come in contact with the external skin of the bird. This is certainly the case; but I doubt very much if it is the reason of their plucking the feathers off their belly. Some water-birds, as the different species of *Colymbus*, preserve the same dense mass of feathers on their belly during breeding, as at other seasons. Most birds, however, at this period, have a much thinner covering on their abdomen than usual, and this is produced, in my opinion, partly by the friction of hatching, partly by the excess of animal warmth which is concentrated in that region. The female of the Iceland grouse, and of many wading birds, have the breast and belly nearly quite bare with breeding. But this falling out of the feathers is a consequence of hatching, and belongs to the next period. An entirely different relation takes place among some of the boreal aquatic and wading birds. These pluck off a number of feathers from one or more spots of the belly on the developement of the pairing impulse, and before they have laid any eggs, or have begun to hatch. This gives rise to certain naked spots, which I call ***Breeding Spots***. The utility of this arrangement is various. There is generally so thick a layer of feathers upon the belly of most aquatic

OF BIRDS IN GENERAL.

Nothing can exceed the patience of birds while hatching; neither the calls of hunger, nor the near approach of danger, can drive them from the nest. They are often fat upon beginning to sit, yet before incubation is over, the female is usually wasted to skin and bone. Ravens and crows, while the females are sitting, take care to provide them with food; and this in great abundance. But

birds, that without some process of this kind, the eggs would hardly ever be brought directly in contact with the skin of the mother. In the second place, most aquatic birds have no nest, or other means of furnishing warmth to their eggs, even in the coldest climates. The breeding spots thus form, as it were, a nest on the body of the parents, as they collect with their bills all the eggs into this artificial cavity, so that they are quite surrounded by the feathers.

The discovery of this peculiar phenomenon in the history of the boreal birds is entirely my own. Only occasionally do we find former writers directing our attention to these breeding spots, but none seem to have recognised their real importance. Being only found in the boreal birds, the discovery was reserved for a naturalist who had an opportunity of spending the summer in their native haunts. Gunnerus remarks of the *Procellaria glacialis*, that he had found no such cavity, but that the medical student, Martin, had observed them to possess a hole under the crop beneath the large feathers, which he thought might perhaps serve for the hatching of eggs. Fabricius remarks also of this bird that he had found this hollow: his words are, *Aream deplumem sub abdomine etiam reperi.* M. Boie has observed, in his Travels, (p. 192,) which were written at the same time with my Prodromus, with respect to the *Lestris parasitica*, that this bird lays only two eggs, and shows that the two parents, which sit alternately, have on both sides of the belly a naked spot, of the size of one of the eggs, and the editor hazards the conjecture that these naked spots may be found in many others of the aquatic and wading tribes.

The true uses of these spots I shall now endeavour to unfold. Birds seldom pluck off their feathers in order to lay them in the nest. Those which are most naked of all during the breeding season, either build no nest, or have no feathers in it. Only the *Anas* and *Sula* tear out their feathers to line their nests. Therefore, we do not find in the nest the feathers which have been taken off the body of the bird. It is necessary that a portion of the great mass which covers the abdomen be removed, in order that the eggs come into immediate contact with the epidermis. This is the first use of the breeding spots. It cannot, however, be their only use, because they are wanting in many of the aquatic birds of the compound monogamy, whose coat of feathers, as just mentioned, is no thinner, as in the *Sula* and *Carbo*. They must, therefore, be intended to envelope and furnish the eggs with warmth.

I have found these breeding spots only in the boreal aquatic birds, and confined to those species which belong to the perfect or compound monogamy. It would be extremely interesting if their existence could be established in the aquatic birds of other zones. They are never found in the genera *Colymbus* and *Podiceps*, which belong to the partial monogamy. They are equally wanting in those simply monogamous, as the *Mergus*, *Anas*, *Anser*, *Cygnus*. But all these birds have the habit of plucking out their feathers for the purpose of lining their nests, which does not exist in those birds which belong to the perfect monogamy, such as the *Phalaropus*, *Uria*, *Alca*, *Mormon*, *Carbo*, *Puffinus*, *Sula*, *Sterna*, *Larus*, *Lestris*, and *Procellaria*. Breeding spots are found in all these genera, with the exception of the *Sula* and *Carbo*.

As both male and female of these species share the labours of hatching, the breeding spots are found in both sexes, with the remarkable exception, however, of the *Phalaropus*, where they exist only in the male. Among the many hundred individuals of this species which I have examined at the breeding season, I have not seen a single instance of these being wanting, or of their varying in position and number in the individuals of the same species. For they are not a consequence of an unusual deficiency of feathers in these birds, but they follow the most precise rules, both in regard to position and number, and furnish a sure specific character of the different boreal aquatic birds.

Their number is only two; in my prodromus, (p. 90,) it is indeed stated that the *Larus tridactylus* has from three to four. But I had before me at the time specimens which were only commencing the process of the removal of feathers from the belly; and I doubt not but that, as in the other northern gulls, these different patches would have united into a single one in the centre of the abdomen, when it had assumed its finished form. The *Phalaropus*, *Uria grylle* and *alle*, *Alca torda*, *Mormon fratercula*, *Lestris*, have two breeding spots. The *Uria brunnichii* and *troile*, *Puffinus arcticus*, *Sterna arctica*, *Larus tridactylus*, *glaucus*, *marinus*, and the *Procellaria glacialis*, have but one spot. One of the most important distinctions between the *Alca torda* and *Uria troile auctorum* is, that the former has two, and the latter but one breeding spot.

it is different with most of the smaller kinds: during the whole time the male sits near his mate upon some tree, and soothes her by his singing; and often when she is tired takes her place, and patiently continues upon the nest till she returns. Sometimes, however, the eggs acquire a degree of heat too much for the purposes of hatching: in such cases, the hen leaves them to cool a little; and then returns to sit with her usual perseverance and pleasure.*

In regard to position, they are always on the belly, never on the breast; and when one only is present, it is constantly in the middle of the belly, when two exist, they are symmetrically on each side. Their form is circular, and proportioned to the size and number of the eggs which they have to cover. A central spot is always larger than each of a pair.

Their number occasionally corresponds to that of the eggs, but sometimes there are more eggs than spots, as in the *Laurus:* in the *Alca torda*, and *Mormon fratercula*, the spots exceed the eggs in number. When a bird has more eggs than spots, these are generally large, and capable of including more than a single egg. When the spots are more numerous than the eggs, these change their position.

The *Uria grylle*, *Lestris catarractes*, *pomarina* and *parositica* have two eggs, and two breeding spots. The *Uria Brunnichii* and *troile*, *Puffinus arcticus* and *Procellaria glacialis* have one egg, and one spot. The *Uria alle*, *Alca torda*, and *Mormon fratercula* have but one egg, and two breeding spots.

The *Phalaropus cinereus* and *Platyrhinchus* lay four eggs, and have but two breeding spots. The *Sterna arctica*, *Larus glaucus*, *marinus*, and *tridactylus*, have sometimes three, sometimes two eggs, but constantly only one breeding spot.

These spots are not entirely meant to supply the place of a nest; they are, therefore, not invariably in an inverse ratio to the building impulse. Certainly, the species which want these spots, as the *Sula* and *Carbo*, build a nest; most of those also, which are provided with them build no nest, as the *Phalaropus*, *Uria*, *Alca*, *Morindu*, *Puffinus*, *Sterna*, *Lestris*, *Procellaria;* but the genus *Larus* have breeding spots, and build nests.

Their presence is, therefore, merely a proof of the developement of the pairing impulse, but is not to be considered as synonymous with the laying of eggs or hatching. Birds pluck out their feathers before even they have joined their mates, and without being certain of breeding that year. Therefore I have found them in May, in individuals of the *Lestris catarractes* and *Procellaria glacialis*, which were so far out at sea, and removed from the breeding places of the species, that I had good cause for reckoning these barren birds, which pass the summer without breeding. They also exist in the single individuals of the *Lestris parasitica*, which flock about together.

After hatching is over, these bare spots are very quickly again covered with feathers. All traces of them have disappeared in August and September, when the young of some species are not yet fledged.—ARCANA OF SCIENCE, 1833.

* ON THE DIFFERENT COLOURS OF THE EGGS OF BIRDS.—It is a remarkable provision of nature, that birds whose nests are most exposed, and whose eggs are most open to the view of their enemies, lay eggs of which the colour is the least distinguishable from that of surrounding objects, so as to deceive the eye of birds or of other plundering animals; while birds, the eggs of which have a bright, decided colour, and are consequently very conspicuous, either conceal their nests in hollows, or only quit their eggs during the night, or begin to sit immediately. It is also to be remarked, that in the species of which the nest is open, and the female brings up the brood without the assistance of the male, these females are generally of a different colour from the male, less conspicuous, and more in harmony with the objects around. The foresight of nature has, therefore, provided for the preservation of the species of which the nest is altogether exposed, by imparting to the eggs a colour which will not betray them at a distance, while she could, without inconvenience, give the brightest colour under circumstances where the eggs are concealed from view. Or, perhaps, to speak more correctly, numerous birds can deposit their eggs in places accessible to view, because the colour of the eggs makes them confounded with the surrounding objects, while other birds are obliged to conceal their nests, because the conspicuous colour of the eggs would have attracted their enemies. Let the explanation, however, be what it may, the fact exists, and M. Gloger, who has examined all the birds of Germany, has satisfactorily proved it.

Eggs must be distributed into two series, according as their colour is simple or mixed. The simple colours, such as white, blue, green, yellow, are the brightest, and consequently the most dangerous for the eggs.

1. The pure white, the most treacherous of colours, is found among birds which breed in hollow places, like the woodpeckers, the wrynecks, the roller, the merops, the kingfisher, the snow-bunting, the robin, the water

The production of the young, as was said, seems to be the great æra of a bird's happiness. Nothing can at that time exceed its spirit and industry: the most timid becomes courageous in the defence of its young. Birds of the rapacious kind, at this season, become more than usually fierce and active. They carry their prey, yet throbbing with life, to the nest, and early accustom their young to habits of slaughter and cruelty. Nor are those of milder natures less busily employed; the little birds then discontinue their singing, taken up with more important pursuits of common subsistence.

While the young are yet unfledged, and continue in the nest, the old ones take care to provide them with a regular supply; and lest one should take all nourishment from the rest, they feed each of the young in their turn. If they

owzel, the swallow, the martin. It is only among these birds that the eggs are of a remarkable whiteness. The eggs are also white among some species which, like the domestic swallow, certain passeres, the troglodites, &c. constructed their nests with such narrow openings, that the eye of their enemies cannot penetrate within. White eggs are also found with birds that quit them only during the night, or at least very late during the day, such as the owls and falcons. Lastly, this colour is found among birds which have only one or two eggs, and sit immediately after, like the pigeons, the boobies, and the petrels.

2 As to the bright green or blue colour, it is found to belong to many species which make their nests in hollows, like the starling, the bullfinch, the flycatcher, &c. In the second place, this colour is common to the eggs of birds, the nests of which are constructed with green moss, or placed at least in the midst of grass, but always well concealed, such, for example, as the tomtit, linnet, &c. Lastly, green eggs are met with among many strong birds able to defend themselves against plunderers, like the herons.

3. A light green colour, verging towards a yellowish tint, is found among the eggs of the many gallinaceæ which lay among the grass without making a finished nest, which soon disappears beneath the quantity of eggs; like the hoopoe, the perdrix cinereus, the pheasant. The same colour is also remarked among several of the palmipedes, which quit their eggs when they lay them, but which are attentive in watching them, as the swans, the geese, the ducks, the divers, &c. The eggs of certain great birds which make their nests in the open air, but are well able to defend themselves, are a dirty white, as may be observed among the vultures, eagles, and storks.

Among the eggs of a mixed colour, they are to be distinguished which have a white ground, and those of which the ground differs from white. The eggs with a white ground are those of the European oriole, the long-tailed tit, the cole-tit, the nut-hatch, the creeper, and the common swallow. Most of the eggs with a white ground are concealed in well-covered nests. The eggs of a mixed colour, and of which the ground is not white, at least of a pure white, are those of the lark, the grasshopper-lark, the yellow-hammer, the wagtail, &c.; then the crows, the jays, the thrushes, the quails, &c., with most of the singing birds, the colour of the interior of whose nest harmonizes with that of the eggs.

We have inserted an abstract of M. Gloger's paper, from the attention which his hypothesis seems to have met with from continental naturalists. For ourselves, we have been led to conclude that he is among the number of philosophers who first imagine a system, and then would elaborate facts to support it. The rooks, for example, build a nest particularly exposed on the highest trees; the jackdaws conceal theirs in holes, while the lapwing, woodcock, and snipe lay on the bare ground, and yet the colour of the eggs of all these birds is nearly identical, again the blackbird and song-thrush are birds of very similar habits; they build in the same places, but the blackbird lays a dull, rusty-coloured egg, and the thrush a clear blue one, with a few dark, well-defined spots The woodpeckers, it is asserted, lay white eggs, they ought, according to the theory, but their practices seem very different. The hawks which are so able and accustomed to defend their nests, we should expect to find with pure white eggs, but they are dull-coloured and inconspicuous; the buzzards, the most cowardly among the tribe, have perhaps the most conspicuous eggs of that tribe. The magpie is a strong bird, its eggs well concealed, and the nest fortified; but the colour of this egg is dull, like the rook, woodcock, &c. Two very similar eggs are those of the redstart and hedgesparrow; the former builds in holes, the latter does not The cuckoo very commonly selects the nest of the hedgesparrow, a spotted brown egg among bright blue. Now if we admit that the brightest white eggs are to be found in birds whose nests are the most concealed, as the kingfisher, wryneck, wrens, tits, sparrows, and especially the sand-martin, may we not infer that, because the interior of these nests is peculiarly dark, the bright white colour is convenient to the bird, to enable her to distinguish them? At all events, we must regard M. Gloger's hypothesis as ingenious, rather than supported by facts.—ARCANA OF SCIENCE, 1830.

perceive that man has been busy with their nest, or has handled the little ones, they abandon the place by night, and provide their brood a more secure, though less commodious retreat. When the whole family is fully plumed, and capable of avoiding danger by flight, they are then led forth when the weather is fine, and taught the paternal art of providing for their subsistence. They are led to the places where their food lies; they are shown the method of discovering or carrying it away; and then led back to the nest for a day or two longer. At length when they are completely qualified to shift for themselves, the old ones take them abroad, and leading them to the accustomed places, forsake them for the last time; and all future connexion is ever at an end.

Those birds which are hatched and sent out earliest in the season are the most strong and vigorous; those, on the other hand, that have been delayed till the midst of summer, are more feeble and tender, and sometimes incapable of sustaining the rigours of the ensuing winter. Birds themselves seem sensible of this difference, and endeavour to produce early in the spring. If, however, their efforts are obstructed by having their nests robbed, or some similar accident, they still persevere in their efforts for a progeny; and it often happens that some are thus retarded till the midst of winter. What number of eggs any bird can lay in the course of a season is not ascertained; but this is true, that such as would have laid but two or three at the most, if their nests be robbed or their eggs stolen, will lay above ten or twelve.[*]

Birds in general, though they have so much to fear from man and from each other, are seldom scared away from their usual haunts.[†] Although they be so perfectly formed for a wandering life, and are supplied with powers to satisfy all their appetites, though never so remote from the object, though they are so well fitted for changing place with ease and rapidity, yet the greatest number remain contented in the districts where they have been bred, and by no means exert their desires in proportion to their endowments. The rook, if undisturbed, never desires to leave his native grove; the blackbird still frequents its accustomed hedge; and the redbreast, though seemingly mild, claims a certain district, from whence he seldom moves, but drives out every one of the same species from thence without pity. They are excited to migration by no other motives but those of fear, climate, or hunger. It must be from one of these powerful motives that the birds, which are called birds of passage, every year forsake us for some time, and make their regular and expected returns. They unite together in some open place, for some days before their departure, and, by an odd kind of chattering, seem to debate on the method to proceed. When their plan is resolved upon, they all take flight together, and often appear in such numbers, that to mariners at sea, they seem like a cloud that rests upon the horizon.

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[*] NIDIFICATION.—The nidification and breeding of the feathered tribes are extraordinary. There is one circumstance which more than any other is calculated to excite surprise, viz the faculty in birds of being able to deposit eggs at pleasure. If for instance a partridge is disturbed during the period of laying, or if the eggs deposited be destroyed, she will abandon laying, seek another nest, and deposit in it the usual number of eggs. But this faculty is not confined to the partridge; it is general to the feathered tribes. When a magpie has deposited two eggs in her nest, if one be taken away, she will drop another; and the process may be continued: thus as long as one egg is left, the bird will continue to lay to the amount of four times her usual number. They thus possess the faculty of suspending the operations of nature, and renewing them at pleasure.—ED.

WHY BIRDS ARE OVIPAROUS.—From what has been said in the introductory chapter, (says Sir Charles Bell,) of the weight of the body being a necessary concomitant of muscular strength, we see why birds, by reason of their lightness, as well as by the conformation of their skeleton, walk badly. And on the other hand, in observing how their lightness is adapted for flight, it is remarkable how small an addition to their bodies will prevent them rising on the wing. If the griffon-vulture be frightened after his repast, he must disgorge before he flies; and the condor, in the same circumstances, is taken by the Indians, like a quadruped, by throwing a lasso over it. It is interesting to notice the relations of great functions in the animal economy. Birds are oviparous because they never could have risen on the wing had they been viviparous; if the full stomach of a carnivorous bird retard its flight, we perceive that it could not have carried its young. The light body, the quill feathers, the bill, and the laying of eggs, are all necessarily connected.—BRIDGEWATER TREATISES.

PRESERVATION OF EGGS.—As it is of great importance in a zoological view, to be able to transport eggs fresh from one country to another, the best method of effecting this, is to varnish them with gum arabic, and then imbed them in pounded charcoal. The gum arabic answers better than varnish, (sometimes used,) as it can easily be removed by water; and the bed of charcoal, by maintaining around the eggs a pretty uniform temperature, prevents them from suffering from the great alterations of heat and cold, experienced in conveying them to different countries.—ED.

[†] HABITS OF BIRDS.—The continuance of a nest in the same spot for several years is more remarkable in the case of migratory birds than in that of magpies, which do not migrate, and seldom go to any considerable distance from their breeding trees. There has been in a garden adjacent to ours, the nest of a blackcap for a succession of years, and broods have been successively reared there, without any observable increase in the population of the species. Yet this bird, which is little bigger than a wren, weighing only half an ounce, has to traverse annually the whole of the south of Europe, and probably a great proportion of the north of Africa, exposed of course to numerous accidents, as well as to occasional scarcity of its appropriate food. From the regular annual resto-

This migration from the north usually begins in September, when they quit their retreats, and disperse themselves over all the southern parts of Europe. It is not unpleasing to observe the order of their flight: they generally range themselves in a long line, or they sometimes make their march angularly, two lines uniting in the centre like the letter V reversed. The bird which leads to the point seems to cleave the air, to facilitate the passage for those which are at follow.* When fatigued with this laborious station, it falls back into one of

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ration, however, of this nest at the same spot, it is obvious that one, if not both of the blackcaps, must have been wont to perform this extensive migration to and from Africa as safely as the more hardy cuckoo or the more swift-winged swallow. During the spring of 1831, the blackcaps, which we suppose to be the same birds, from their keeping to the same place of nestling, were more than usually late in arriving, for in another garden about a mile off, there were young in the hereditary nest of blackcaps before our little neighbours made their appearance from the south. When they did arrive, their attention was immediately attracted by the unusual circumstance of hearing the loud song of a rival in the vicinity of their premises. This was a cock blackcap, which we had purchased the preceding autumn in the bird-market at Paris, and which was daily hung out in his cage to enjoy the fresh air and the sunshine, within a gunshot of their usual place of nestling. The wild birds did not appear to like the little stranger at all; and the cock kept flying around the cage, alternately exhibiting curiosity, fear, anger, defiance, and triumphant exultation. Sometimes he would flit from branch to branch of the nearest tree, silently peeping into the cage with the utmost eagerness; all at once he would dart off to a great distance, as if afraid that he was about to be similarly imprisoned; or getting the better of his fears, he would perch on a conspicuous bough and snap his bill, calling *check, check*, seemingly in a great passion; again he would sing his loudest notes by way of challenge, or perhaps meaning to express his independence and superiority. Our cage-bird, meanwhile, was by no means a passive spectator of all this; and never failed, on the appearance of the other, to give voice to his best song and to endeavour to outsing him, since he could not get at him to engage in personal conflict.

This sort of altercation continued for more than a week, but the wild bird became gradually less eager to pry into the cage, or to take any other notice of the cage-bird; and at length ceased altogether to approach it, his attention being now wholly occupied in attending to his mate, and aiding her in building their nest. It is worthy of remark, that though on their first appearance, they resorted to the garden where the nest had hitherto been built, they finally fixed their residence in another garden, at some distance, induced no doubt by the vicinity of our cage-bird to their former haunts. The distance of the place to which they removed is such, that we can readily hear the song of the cock, and our bird is no less eager to answer and to endeavour to outsing him than at first; while, it is worthy of remark, that the wild bird seems no longer interested in such rivalry, and sings as if his only concern was to please himself and his mate.—HABITS OF BIRDS, *in the series of Entertaining Knowledge.*

* FLIGHT OF BIRDS.—Why do geese fly in a string? or why as they frequently do in the form of the letter > pointed? Ornithologists say that it is easier for them thus to cleave the air. When the bird at the head of the string, or he at the point of the V, becomes fatigued with smoothing the way for

the wings of the file, while another takes its place With us they make their appearance about the beginning of October, circulate first round our shores, and when compelled by severe frost, betake themselves to our lakes and rivers.

It has been often a subject of astonishment, how animals to all appearance so dull and irrational should perform such long journeys, should know whither to steer, and when to set out upon such a great undertaking. It is probable that the same instinct which governs all their other actions operates also here. They rather follow the weather than the country; they steer only from colder or warmer climates into those of an opposite nature, and finding the variations of the air as they proceed in their favour, go on till they find land to repose on. It cannot be supposed that they have any memory of the country where they might have spent a former winter; it cannot be supposed that they see the country to which they travel, from their height in the air; since, though they mounted for miles, the convexity of the globe would intercept their view; it must therefore only be, that they go on as they continue to perceive the atmosphere more suitable to their present wants and dispositions.

All this seems to be pretty plain; but there is a circumstance attending the migration of swallows which wraps this subject in great obscurity. It is agreed on all hands that they are seen migrating into warmer climates, and that in amazing numbers, at the approach of the European winter.* Their return into

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the rest, he falls behind, and another takes his place; and so of each individual in succession We are always very sceptical when a birdman becomes oracular; and we should like to know if a fleet would make more progress when made to sail in the V form than if extended in a line If the first bird smooth the way for the second, how does this happen? By sheltering it from the wind? But then geese do not always fly against the wind; and besides the form of a goose is not calculated to break the wind Many birds besides geese fly in the same manner, cormorants and gannets for example. Several circumstances are to be attended to before we may reason on the subject In the first place, birds that do not fly to great distances never proceed in lines Thus a covey or pack of grouse always flies in confusion. Secondly, all birds that remove to great distances do not fly in lines. Thus rooks never do so, nor do fieldfares, nor snow-buntings. It is among the aquatic birds that we find most of the species that fly thus:—for example the swan, the various kinds of geese, many ducks, the gannet, the puffin, &c But all aquatic birds do not so fly. Thus gulls, petrels, terns, &c fly irregularly Many of the waders also assume the linear form in flying; for instance, the stork, the heron, the common plover occasionally, and many others. There are other circumstances required to be noticed. Such as we have before indicated, however, we have only mentioned to show that conjectures are of no real utility in natural history, and that a mere list of names of birds, with straggling remarks, does not constitute a history of those animals —Ed.

* Prognostics of Weather indicated by Birds and other Animals —Birds, although placed by their organization in an inferior rank to mammiferous animals, appear nevertheless more sensible to the variations and influences of the air which they inhabit, than other creatures which live upon the earth. Amongst the ancients, in times the most remote, birds were omens of bad or good luck; their flight was studied, and favourable or sinister presages drawn from it, several of them were even held in the highest veneration The predictions which they furnished or gave rise to were considered by country people as so many oracles emanating from the Divinity himself Nor is it merely the simple peasant of those early ages whose attention they have excited; every naturalist, sportsman, or admirer of nature, has avowed that all animals, from the insect to the most powerful of formed beasts, has a presentiment of the changes of the weather before any barometer, thermometer, or other meteorological instrument has indicated the least variation in the atmosphere.

The navigator often consults them, and is rarely deceived by their prognostics; the sportsman, and all who are obliged to pass great part of their time in woods and forests, must have made similar observations.

The author's intention is not to describe all the qualities which enable animals to foretell the weather, but merely to draw the attention of observing persons to a subject so little known.

Signs of fine weather. 1st. *By Birds*. When the fisher-martin (*Alcedo hispida*) and the ducks quit the land, and take refuge towards the sea; when kites and bitterns cry out as they fly; swallows rise very high in the air, (because the flies then keep in the upper regions;) crows and sparrow-hawks cry frequently and strongly; turtles coo slowly;

Europe is also as well attested about the beginning of summer; but we have another account which serves to prove that numbers of them continue torpid here during the winter; and like bats, make their retreat into old walls, the hollow of trees, or even sink into the deepest lakes, and find security for the winter season, by remaining there in clusters at the bottom. However, this latter circumstance may be, their retreat into old walls is too well authenticated to remain a doubt at present.* The difficulty, therefore, is to account for this

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owls screech; wrens (*Sylvia troglodytes*) sing from nine to ten in the morning, and in the afternoon from four to five; after that time their song announces rain.

2ndly. *By other animals*.—When frogs that are inclosed in glasses rise to the highest part, glow-worms move about in vast numbers of an evening, insects and flies sport in the air after sunset, bats appear late; and spiders spin quietly and spread their nets widely.

Indications of rain. 1st. *By Birds*.—When the large black sea-gulls, cormorants, and birds that delight in tempests, as well as fresh water birds and others, seek the rivers and bathe themselves with much noise; ducks and geese plunge, shake themselves, and are very noisy, wild geese fly high and wildly; plovers become restless, flying here and there, and uttering their piercing cries; ravens and rooks collect in groups, and separate almost immediately; the ravens in the morning and the crows in the evening utter continual cries and walk separately on the sand; the swallows fly low; magpies are very noisy, domestic fowls play in the dust; partridges, pigeons, and smaller birds roll in the sand, the cock crows immediately after the setting of the sun, (when on the contrary, the cock struts about during rain it is a sign that it will soon cease.) the chaffinch raises its melancholy note; the woodlark, linnet, sparrow, and redbreast cry and sing from day-break, peacocks and owls scream louder and oftener than usual during the night; hens are longer scratching for their vermin, and those insects then penetrate deeper into the skin.

2ndly. *By other animals*.—When beasts snap at the air towards the south; red deer, sheep, and goats jump about a great deal and are quarrelsome, hogs play and scatter their food about; cats rub their faces and ears; dogs are restless, scratch the ground, eat grass, growl, and bark; foxes bark and wolves howl; moles throw up the earth higher than usual; frogs croak much and take refuge in the meadows; bats do not quit their retreats of an evening, spiders work but little, make very short webs, and retire to their corners; flies sting horses and cattle in the legs, and fly about tumultuously; the fish *cobitis fossilis* troubles the water, and the earthworm removes the soil.

Birds afford the following presages of wind:—when sea-birds and those that frequent marshes, fly in clouds to the sea-shore, and sport about there, especially in the morning; when those that delight in storms take refuge upon the masts of ships; when wild geese fly high and in flocks, and direct their course to the east; water-fowls are agitated and cry out, the whoop cries very loud; the fisher-martin flies towards land, and the *corvus frugilegus* cleaves the air rapidly, and sports on the margin of the water. It is notorious hares have a presentiment of wind, and they often lie down for ten hours beforehand, in the quarters where it will be most felt.—ARCANA OF SCIENCE FOR 1828.

* TORPOR.—This state is obviously analogous to sleep: but it differs from sleep in being occasioned solely by temperature. Almost all animals seem to be susceptible of this state, not even excepting man; for the apparent death produced by cold is probably nothing else but a species of torpor, out of which the animal in most cases, might be roused, if the requisite caution in applying the heat were attended to, for death, in most cases, seems to be produced, not by cold, but by the incautious application of heat, which bursts the vessels and destroys the texture of the body. It is well known that if any part of the body be frost-bitten an incautious application of heat infallibly produces mortification, and destroys the part. There is a remarkable example, in the twenty-eighth volume of the Philosophical Transactions, page 265, of a woman almost naked, lying buried for six days under the snow, and yet recovering. In this case, it is scarcely possible to avoid supposing that the woman must have been in a state of torpor otherwise she would certainly have endeavoured to find her way home.—ED.

MIGRATION. Many authentic facts prove the migration of our summer birds, and that they desert the temperate zone at the approach of winter to seek a better climate in lower latitudes. Besides all the tribes of birds of passage feed upon insects which disappear and become torpid, either in a perfect or embryo state, soon after the autumnal equinox; they are, therefore, compelled to migrate southward, in search of their natural food. The winter-birds of passage forsake the frosty confines of the arctic circle, to spend the winter in the more temperate parts of Europe; the jacksnipe, redwing, woodcock, and fieldfare are of this tribe. About the end of April they return to the north, to pass the breeding season. It is also well known that swallows winter in different parts of Africa.

difference in these animals thus variously preparing to encounter the winter. It was supposed that in some of them the blood might lose its motion by the cold, and that thus they were rendered torpid by the severity of the season; but Buffon having placed many of this tribe in an ice-house, found that the same cold by which their blood was congealed was fatal to the animal; it remains, therefore, a doubt to this hour whether there may not be a species of swallows, to all external appearance like the rest, but differently formed within, so as to fit them for a state of insensibility during the winter here. It was suggested, indeed, that the swallows found thus torpid were such only as were too weak to undertake the migration, or were hatched too late to join the general convoy; but it was upon these that Buffon tried his experiment; it was these that died under the operation.

Thus there are some birds which by migrating make an habitation of every part of the earth; but in general every climate has birds peculiar to itself. The feathered inhabitants of the temperate zone are but little remarkable for the beauty of their plumage; but then the smaller kinds make up for this defect by the melody of their voices.* The birds of the torrid zone are very bright and vivid in their colours; but they have screaming voices, or are totally silent. The frigid zone, on the other hand, where the seas abound with fish, are stocked with birds of the aquatic kind, in much greater plenty than in Europe; and these are generally clothed with a warmer coat of feathers; or they have large quantities of fat lying underneath the skin, which serves to defend them from the rigours of the climate.†

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* SINGING BIRDS OF THE OLD AND NEW WORLD.—It is a very unfounded notion that in the new world the brilliant hues of the birds take the place of the power of song On the contrary, it would appear from Wilson's *American Ornithology*, that the American song-birds are infinitely more numerous than those of Europe, and many of them superior to our most celebrated songsters.—ARCANA OF SCIENCE, 1829.

† PLUMAGE OF BIRDS.—It is observable in many varieties of birds that the males are furnished with plumage of the most beautiful description, while the females are of a dull, earthy colour It is not difficult to assign a reason for this, and one which always gives me pleasure to reflect upon; for if so much care is taken by our Heavenly Father, in the preservation of an insignificant bird, may we not, with the utmost confidence, look to the same source for protection, if we rightly and sincerely apply for it.

If hen-birds, who sit and are exposed to the view of beasts and birds of prey, had the same gaudy colours as the male, they would presently be discovered and destroyed; whereas by having plumage of a dull, or earthy colour, they can scarcely be distinguished from the ground on which they sit, and thus escape observation and destruction. This is particularly shown in the pheasant, peacock, and duck tribe What can be more beautiful than the plumage of the male bird, while that of the female is so dull that it appears to belong to another species. The same observation applies to the chaffinch, yellow-hammer, and many other birds that might be mentioned, while the plumage of the male and female falcon, swan, raven, owl, and other species of birds who are able to defend themselves is the same —JESSE'S GLEANINGS.

PLUMAGE OF HEN BIRDS.—The shooting season of 1827, having been unusually productive of hen pheasants, which assumed more or less the appearance of the male, much discussion arose on this change. From a paper read at the Royal Society, entitled "*On the change in the plumage of some hen-pheasants*," communicated by W. Morgan, Esq. F.R S, we learn that the author, having had many opportunities of examining the parts, as respecting both the pheasant and the domestic fowl, was induced to notice the internal peculiarities which invariably accompany this transformation. According to an opinion of John Hunter and of Dr. Bulter, the change only takes place at an advanced age; but Mr. Yarrel, F.R.S., considers the facts in his possession at variance with this idea, and that the appearances in question may occur at any period of life, and may even be produced artificially. In all the instances examined by him the sexual organs were found diseased, and to a greater or less extent in proportion to the change of plumage. The ovarium was shrunk, purple, and hard; the oviduct diseased, and the canal obliterated at the upper part. Having opened a hen-pheasant in her natural plumage, for the sake of comparison, he found a similar diseased state of the organs to exist, thus proving that the disease must exist some time before the corresponding change of feathers takes place. He observes that it is no uncommon thing to find among numerous broods of pheasants reared by hand, some females, which, at the early age of four months, produce the brightest plumage of

In all countries, however, birds are a more long-lived class of animals than the quadrupeds or insects of the same climate. The life of man himself is but short, when compared to what some of them enjoy. It is said that swans have been known to live three hundred years; geese are often seen to live fourscore, while linnets and other little birds, though imprisoned in cages, are often found to reach fourteen or fifteen. How birds, whose age of perfection is much more early than that of quadrupeds, should yet live comparatively so much longer, is not easily to be accounted for; perhaps, as their bones are lighter, and more porous than those of quadrupeds, there are fewer obstructions in the animal machine; and nature thus finding more room for the operations of life, it is carried on to a greater extent.

All birds in general are less than quadrupeds; that is, the greatest of one class far surpass the greatest of the other in magnitude. The ostrich, which is the greatest of birds, bears no proportion to the elephant; and the smallest humming-bird, which is the least of the class, is still far more minute than the mouse. In these the extremities of nature are plainly discernible; and in forming them she appears to have been doubtful in her operations; the ostrich, seemingly covered with hair, and incapable of flight, making near approaches to the quadruped class; while the humming-bird, of the size of an humble-bee, and with a fluttering motion, seems nearly allied to the insect.

These extremities of this class are rather objects of human curiosity than utility: it is the middle order of birds which man has taken care to propagate and maintain. Of those which he has taken under his protection, and which administer to his pleasures or necessities, the greatest number seem creatures of his formation. The variety of climate to which he consigns them, the food with which he supples them, and the purposes for which he employs them, produce amazing varieties, both in their colours, shape, magnitude, and the taste of the flesh. Wild birds are, for the most part, of the same magnitude and shape; they still keep the prints of primæval nature strong upon them: except in a few they generally maintain their very colour: but it is otherwise with domestic animals, they change at the will of man; of the tame pigeon, for instance, it is said that they can be bred to a feather.[*]

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the male; and in two instances of birds shot in a wild state, the nest feathers had not been shed, proving them to have been birds of the year. A partridge having a white bar across the breast, and the first three primaries in each wing white, being opened, exhibited the same sort of organic disease. But all variations in plumage are not traceable to this cause. In most of the excepted instances, however the individuals are dwarf birds; and the author attributes their variety of plumage to defective secretion, the effect of weakness. When the sexual organs are artificially obliterated in the common fowl, so soon as the operation is performed in the male bird, he ceases to crow, the comb and gills do not attain their full size, the spurs remain short and blunt, and the feathers of the neck assume an appearance intermediate between the hackled character of the cock, and the ordinary web of the hen. When the oviduct of the female is obliterated, the ova ceases to enlarge; she makes an imperfect attempt to crow; the comb increases in size, and short and blunt spurs make their appearance. The plumage alters in colour and in form, approaching to that of the cock; in short, the two sexes approximate so nearly in character by the process, that it frequently becomes difficult to determine the sex.—Zoological Journal.

[*] The Bird Race.—We gave from Wilbrand and Ritsen's Picture of Organized Nature, the distribution of the orders of mammalia, according to the laws of latitude, in both hemispheres: we come now to the birds. Marine birds, of both hemispheres, are most abundant in the polar seas and among the icy plains on the limits of organic life. The tropical birds (*Phäeton*) inhabit the regions between the tropics. The albatross inhabits the seas of the frigid and temperate zones of both hemispheres. Pelicans are found over the three zones of both hemispheres, and in fresh water as well as in the sea. Gulls and cormorants are peculiar to the northern hemisphere. Ducks and geese are spread over the whole earth, but are most numerous in the colder half of the temperate zone. Moorfowl and other Grallæ spread over both hemispheres, from the snow line to the torrid zone. Herons are plentiful in the temperate and warm zones. The common rail is met with in most countries in Europe, and in North America. The plover spreads over the zones of both hemispheres as far as the snow line. The snipe appears to be peculiar to the northern hemisphere, and the

CHAP. III.

THE DIVISION OF BIRDS.

Though birds are fitted for sporting in air, yet as they find their food upon the surface of the earth, there seems a variety equal to the different aliments with which it tends to supply them. The flat and burning desert, the rocky cliff, the extensive fen, the stormy ocean, as well as the pleasing landscape, have all their peculiar inhabitants. The most obvious distinction, therefore, of birds is into those that live by land, and those that live by water; or, in other words, into *land birds* and *water fowl.*

It is no difficult matter to distinguish land from water fowl by the legs and toes. All land birds have their toes divided, without any membrane or web between them; and their legs and feet serve them for the purposes of running, grasping, or climbing. On the other hand, water fowl have their legs and feet formed for the purposes of wading in water, or swimming on its surface. In those that wade, the legs are usually long and naked; in those that swim, the toes are webbed together, as we see in the feet of a goose, which serve, like oars, to drive them forward with greater velocity. The formation, therefore, of land and water fowl is as distinct as their habits; and Nature herself seems to offer us this obvious distribution in methodizing animals of the feathered creation.

However, a distinction so comprehensive goes but a short way in illustrating the different tribes of so numerous a class. The number of birds already known amounts to above eight hundred;[*] and every person who turns his mind to these kinds of pursuits, is every day adding to the catalogue. It is not enough, therefore, to be able to distinguish a land from a water fowl; much more is still required: to be able to distinguish the different kinds of birds from each other; and even the varieties in the same kind, when they happen to offer. This certainly is a work of great difficulty; and perhaps the attainment will not repay the labour. The sensible part of mankind will not withdraw all their attention from more important pursuits, to give it entirely up to what promises to repay them only with a very confined species of amusement. In my distribution of birds, therefore, I will follow Linnæus in the first sketch of his system, and then

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Ibis Tantalus, which is related to the snipe, is numerous in warm countries.

The land birds, Vultur and Falco, extend over both hemispheres, perhaps even farther than the snow line. The owl is spread over all the habitable globe. The butcher-bird is found in the warm and temperate zones of both hemispheres. The parrots, a numerous family, are almost confined to the tropical regions. Ravens, like owls, are spread over both hemispheres. Nuthatches, bee-eaters, and humming birds chiefly belong to warm climates. Sparrows are diffused over the whole of the habitable globe, but are most abundant in the warm zone. The family of finches is very abundant in the colder parts of the temperate zone. The nightingale is met with throughout Europe, from Sweden to Greece, and also in Siberia. The family of the thrush extends from the temperate to the warm zones. The family of larks inhabit the warm countries, but the field lark in Kamtschatka. Swallows spread over the frigid, temperate, and torrid zones. Our chimney swallow (*Hirundo domestica*) is found from Norway to the Cape of Good Hope, from Kamtschatka to India and Japan, and in all the regions of North America. The house martin is found in Europe and America; the swift martin inhabits the whole of Europe. Hens, partridges, and woodcocks are diffused over all the zones, and met with near the snow line. Pigeons inhabit both hemispheres as far as 60°. Pheasants do not extend beyond 46° north latitude. The domestic hen lives in Greenland, but does not breed there or in any cold country. It is found in its wild state in the forests of India. The turkey is wild in the woods of America, and the peacock in those of Asia and Africa.

[*] Since Goldsmith's time, nearly three thousand species of birds have been ascertained, and many of the species have several varieties.—Ed.

leave him, to follow the most natural distinction, in enumerating the different kinds that admit of a history or require a description.

Linnæus divides all birds into six classes:—namely, into birds of the *rapacious kind*, birds of the *pie kind*, birds of the *poultry kind*, birds of the *sparrow kind*, birds of the *duck kind*, and birds of the *crane kind*. The four first comprehend the various kinds of land birds; the two last, those that belong to the water.

Birds of the *rapacious kind* constitute that class of carnivorous fowl that live by rapine. He distinguishes them by their beak, which is hooked, strong, and notched at the point; by their legs, which are short and muscular, and made for the purposes of tearing; by their toes, which are strong and knobbed; and their talons, which are sharp and crooked; by the make of their body, which is muscular; and their flesh, which is impure: nor are they less known by their food, which consists entirely of flesh; their stomach, which is membranous; and their manners, which are fierce and cruel.

Birds of the *pie kind* have the bill differing from the former: as in those it resembled a hook, destined for tearing to pieces, in these it resembles a wedge, fitted for the purpose of cleaving. Their legs are formed short and strong for walking; their body is slender and impure, and their food miscellaneous. They nestle in trees, and the male feeds the female during the time of incubation.

Birds of the *poultry kind* have the bill a little convex, for the purposes of gathering their food. The upper chap hangs over the lower; their bodies are fat and muscular, and their flesh white and pure. They live upon grain, which is moistened in the crop. They make their nest on the ground, without art; they lay many eggs, and use promiscuous venery.

Birds of the *sparrow kind* comprehend all that beautiful and vocal class that adorn our fields and groves, and gratify every sense in its turn. Their bills may be compared to a forceps that catches hold; their legs are formed for hopping along; their bodies are tender—pure in such as feed upon grain, impure in such as live upon insects. They live chiefly in trees; their nests are artificially made; and their amours are observed with connubial fidelity.

Birds of the *duck kind* use their bill as a kind of strainer to their food; it is smooth, covered with a skin, and nervous at the point. Their legs are short, and their feet formed for swimming, the toes being webbed together. Their body is fat, inclining to rancidity. They live in waters, and chiefly build their nests upon land.

With respect to the order of birds that belong to the waters, those of the *crane kind* have the bill formed for the purposes of searching and examining the bottom of pools; their legs are long, and formed for wading; their toes are not webbed; their thighs are half naked; their body is slender, and covered with a very thin skin; their tail is short, and their flesh savoury. They live in lakes upon animals, and they chiefly build their nests upon the ground.

Such is the division of Linnæus with respect to this class of animals; and at first sight it appears natural and comprehensive. But we must not be deceived by appearances: the student, who should imagine he was making a progress in the history of nature while he was only thus making arbitrary distributions, would be very much mistaken. In such a distribution, for instance, he would find the humming-bird and the raven, the rail and the ostrich, joined in the same family. If, when he asked what sort of a creature was the humming-bird, he were told that it was in the same class with the carrion crow, would he not think himself imposed upon? In such a case, the only way to form any idea of the animal whose history he desires to know, is to see it; and that curiosity very few have an opportunity of gratifying. The number of birds is so great, that it might exhaust the patience not only of the writer, but the reader, to examine them all: in the present confined undertaking it would certainly be impossible. I will, therefore, now attach myself to a more natural method; and still keeping the general division of Linnæus before me, enter into some description of the most noted, or the most worth knowing.

But before I enter upon a systematic detail, I will beg leave to give the history of three or four birds that do not well range in any system. These, from their great size, are sufficiently distinguishable from the rest; and from their incapacity of flying, lead a life a good deal differing from the rest of the feathered creation. The birds I mean are the Ostrich, the Cassowary, the Emu, and the Dodo.*

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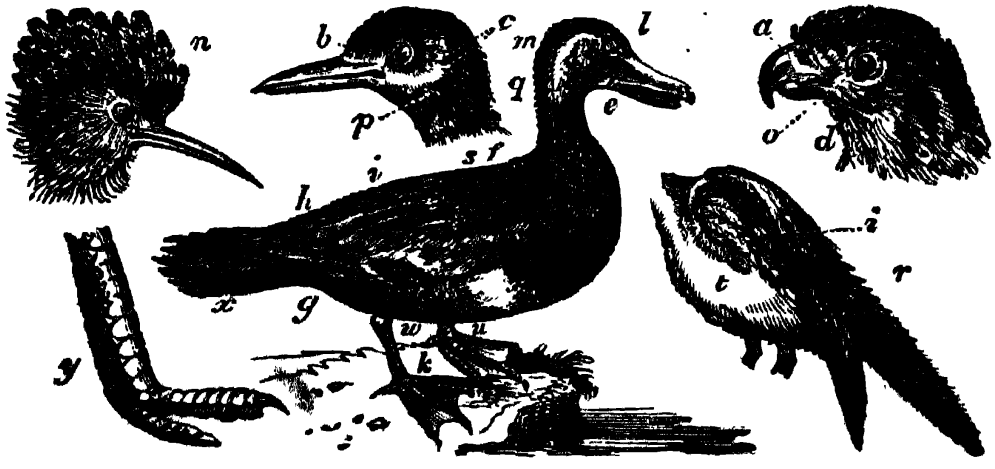
* TERMINOLOGY OF BIRDS.—Young persons and adults to whom the terms used in Ornithology are not familiar, will find useful the following illustrated list of technicalities used in that delightful branch of natural science. They may be applied to any bird in a cage, or stuffed in the Museum; and as such terms are by no means uncommon in catalogues of Menageries and Museums, and are of daily occurrence in general writing, the reader who stores this list in his memory will soon be convinced of the utility of its contents. For the original of the Cuts we are indebted to the first volume of the *Magazine of Natural History*:—

Càput, the head.
Rústrum, the bill.
Nàres, the nostrils.
Cèra, wax (on the bill)—(*fig*. 55, *a*).
Língua, the tongue.
Capústrum, the face.
Lòrum, the lore (*b*).
Témpora, the temples (*c*).
Bárba, the beard, (*d*).
Gùla, the chin (*e*).
Hùmeri, the shoulders (*f*).
Críssum, the vent (*g*).
Téctrices, the wing coverts (*h*).
A lula spùria, bastard wing (*v*).
Spéculum, the wing-spot (*w*).
Scapulàres, scapulars (*i*).
Caùda, the tail.
Tectrices caúdæ, the tail coverts (*x*).
Crùra, the legs (*k*).
Fémora, the thighs.
Tridáctyli, three-toed.
Didáctyli, two-toed (*y*).
Pes, the foot.
Natatòrius, palmated feet (*z*).
Frons, the forehead (*l*).
Vértex, the crown.
O´cciput, the hind head (*m*).
Crísta, the crest (*n*).
O´culi, the eyes.
Supercília, the eyebrows.
O´rbitæ, the orbits (*o*).
Gènæ, the cheeks.
Aúrea, the ears (*p*).
Cóllum, the neck.
Nùcha, the nape (*q*).
Júgulum, the throat.
Uropygium, the rump (*r*).
Interscápulum, between shoulders (*s*).
Axíllæ, axillaries (*t*).
Hypocóndriæ, hypochondres (*u*).
Córpus, the body.
Dórsum, the back.
Péctus, the breast.
Abdòmen, the belly.
Ambulatòrii, walking.
Scansòrii, climbing.
A`læ, the wings.
Réctrices, the tail feathers.
Armíllæ, bracelets.
Dígiti, the toes.
Gressòrii, leaping.
Prehénsilis, grasping.
Lobàtus, lobed feet.
Pinnàtus, pinnated.
Calcària, the spurs.
Carúnculæ, wattles.
Inglùvies, the crop.
Semipalmàtus, semipalmated feet.
U´ngues, the claws.
Córnua, the horns.
Sáccus jugulàris, the pouch.

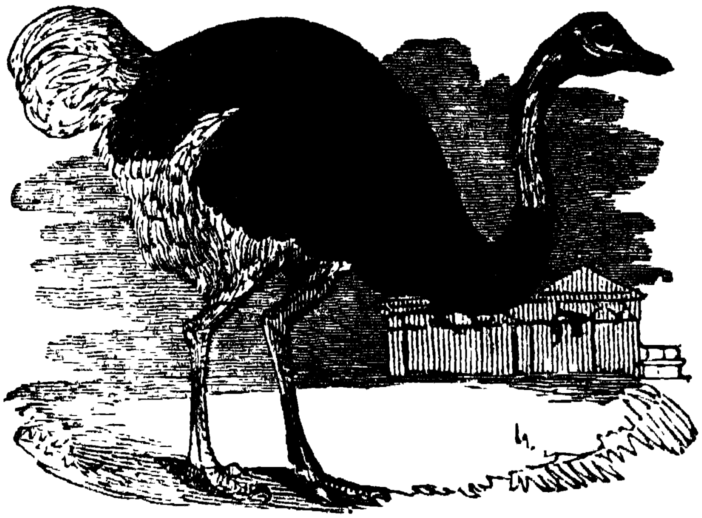


In Mr. Griffith's work there is an engraving which exemplifies terminology in a very judicious manner:—

a, Maxilla, the upper part of the bill.
g, Nares, the nostrils.
d, Dertrum, the hook.
c, Culmen, the ridge.
f, Mesorrinium, the upper ridge.
i, Lorum, naked line at the base.
b, Mandibulæ, lower part of the bill.
h, Menuon, the chin.
e, Gouys, inferior point of the mandible.
j, Frons, front of the head.
k, Capistrum, the face.
l, Vertex, crown of the head.
m, Sinciput, hinder part of the head.
o, Regio ophthalmica, region of the eye.
n, Supercilium, the eyebrow.
p, Tempora, the temples.
q, Gena, the cheeks.
t, Cervix, hinder part of the neck.

CHAP. IV.

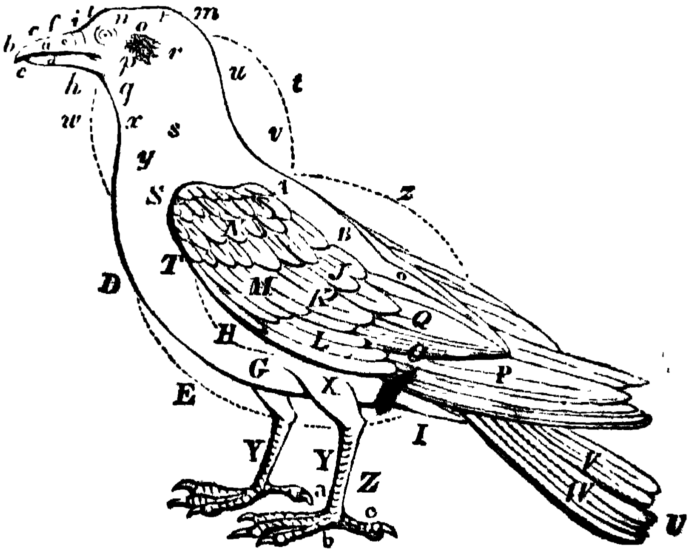
THE OSTRICH.



(The Ostrich.)

In beginning with the feathered tribe, the first animal that offers seems to unite the class of quadrupeds and of birds in itself. While it has the general outline and properties of a bird, yet it retains many of the marks of the quadruped.

The Ostrich is the largest of all birds. Travellers affirm that they are seen as tall as a man on horseback; and even some of those that have been brought into England were above seven feet high. The head and bill somewhat resemble those of a duck; and the neck may be likened to that of a swan, but that it is much longer; the legs and thighs resemble those of a hen; though the whole appearance bears a strong resemblance to that of a camel. But to be more particular, it is usually seven feet high from the top of the head to the ground, but from the back it is only four, so that the head and neck are above three feet long. From the top of the head to the rump, when the neck is stretched out in a right line, it is six feet long, and the tail is about a foot more.



u, Nucha, nape of the neck.
v, Auchenium, below the nape.
s, Collum, the neck.
r, Regio parotica, protuberance over the ear
w, Guttur, the throat.
x, Gula, gullet.
y, Jugulum, lower throat.
z, Dorsum, the back.
A, Interscapulum, between the shoulders.
B, Tergum, middle of the back.
C, Uropigyum, the rump.
U, Cauda, the tail.
V, Rectrices, tail feathers: Intermediæ, middle; and Laterales, side ones.
J, Ala, the wing.
O, Remiges, the oars
P, Primariæ, quills.
K, Tectrices, wing-covers.
L, Majores, largest wing covers.
M, Mediæ, middle wing-covers.
N, Minores, smallest wing-covers.
R, Humeri, shoulders.
S, Flexura, the bend of the wing.
T, Axillæ, the arm-pits.
H, Hypochondria, side of the abdomen.
D, Pectus, the breast.
E, Abdomen.
F, Epigastrum, stomach.
G, Venter, the belly.
I, Crissum, the vent.
X, Tibia, the thigh.
Z, Planta, the foot with the toes.
Y, Tarsus, the foot.
a Aciotarsium, front of the foot.
b, Digiti, toes.
c, Hallux, the great toe.

Magazine of Natural History.

One of the wings, without the feathers, is a foot and a half; and being stretched out, with the feathers, is three feet.

The plumage is much alike in all; that is, generally black and white, though some of them are said to be grey. The greatest feathers are at the extremities of the wings and tail, and the largest are generally white. The next row is black and white; and the small feathers, on the back and belly, some are white and others black. There are no feathers on the sides, nor yet on the thighs, nor under the wings. The lower part of the neck, about half way, is covered with still smaller feathers than those on the belly and back; and those, like the former, also are of different colours.

All these feathers are of the same kind, and peculiar to the ostrich; for other birds have several sorts, some of which are soft and downy, and others hard and strong. Ostrich feathers are almost all as soft as down, being utterly unfit to serve the animal for flying, and still less adapted to be a proper defence against external injury. The feathers of other birds have the webs broader on one side than the other, but those of the ostrich have their shaft exactly in the middle. The upper part of the head and neck are covered with a very fine, clear, white hair that shines like the bristles of a hog; and in some places there are small tufts of it, consisting of about twelve hairs, which grow from a single shaft about the thickness of a pin.

At the end of each wing there is a kind of spur almost like the quill of a porcupine. It is an inch long, being hollow and of a horny substance. There are two of these on each wing; the largest of which is at the extremity of the bone of the wing, and the other a foot lower. The neck seems to be more slender in proportion to that of other birds, from its not being furnished with feathers. The skin in this part is of a livid flesh colour, which some improperly would have to be blue. The bill is short and pointed, and two inches and a half at the beginning. The external form of the eye is like that of a man, the upper eyelid being adorned with eyelashes which are longer than those on the lid below, The tongue is small, very short, and composed of cartilages, ligaments, and membranes, intermixed with fleshy fibres. In some it is about an inch long, and very thick at the bottom; in others it is but half an inch, being a little forked at the end.

The thighs are very fleshy and large, being covered with a white skin, inclining to redness, and wrinkled in the manner of a net, whose meshes will admit the end of a finger. Some have very small feathers here and there on the thighs, and others again have neither feathers nor wrinkles. What are called the legs of birds in this are covered before with large scales. The end of the foot is cloven, and has two very large toes, which, like the leg, are covered with scales. These toes are of unequal sizes. The largest, which is on the inside, is seven inches long, including the claw, which is near three-fourths of an inch in length, and almost as broad. The other toe is but four inches long, and is without a claw.

The internal parts of this animal are formed with no less surprising peculiarity. At the top of the breast, under the skin, the fat is two inches thick; and on the fore part of the belly it is as hard as suet, and about two inches and a half thick in some places. It has two distinct stomachs. The first, which is lowermost, in its natural situation somewhat resembles the crop in other birds; but it is considerably larger than the other stomach, and is furnished with strong muscular fibres, as well circular as longitudinal. The second stomach, or gizzard, has outwardly the shape of the stomach of a man; and upon opening is always found filled with a variety of discordant substances—hay, grass, barley, beans, bones, and stones, some of which exceed in size a pullet's egg.

The ostrich is of all other animals the most voracious. It will devour leather, grass, hair, iron, stones, or anything that is given. Nor are its powers of digestion less in such things as are digestible. Those substances which the coats of the stomach cannot soften pass whole; so that glass, stones, or iron, are excluded in the form in which they were devoured. In their native deserts, however, it is probable they live chiefly upon vegetables, where they lead an inoffensive and social life: the male, as Thevenot assures us, assorting with the female with connubial fidelity.* They are said to be very much inclined to venery; and the make of the parts in both sexes seems to confirm the report. It is probable, also, they copulate, like other birds, by compression; and they lay very large eggs, some of them being above five inches in diameter, and weighing above fifteen pounds. These eggs have a very hard shell, somewhat resembling those of the crocodile, except that those of the latter are less and rounder.

The season for laying depends on the climate where the animal is bred. In the northern parts of Africa, this season is about the beginning of July; in the south, it is about the latter end of December. These birds are very prolific, and lay generally from forty to fifty eggs at one clutch. It has been commonly reported that the female deposits them in the sand; and, covering them up, leaves them to be hatched by the heat of the climate, and then permits the young to shift for themselves. Very little of this, however, is true: no bird has a stronger affection for her young than the ostrich, nor none watches her eggs with greater assiduity. It happens, indeed, in those hot climates, that there is less necessity for the continual incubation of the female; and she more frequently leaves her eggs, which are in no fear of being chilled by the weather; but though she sometimes forsakes them by day, she always carefully broods over them by night; and Kolben, who has seen great numbers of them at the Cape of Good Hope, affirms that they sit on their eggs like other birds, and that the male and female take this office by turns, as he had frequent opportunities of observing.† Nor is it more true what is said of their forsaking their young after they are excluded the shell. On the contrary, the young ones are not even able to walk for several days after they are hatched. During this time, the old ones are very assiduous in supplying them with grass, and very careful to defend them from danger: nay, they encounter every danger in their defence. It was a way of taking them, among the ancients, to plant a number of sharp stakes round the ostrich's nest in her absence, upon which she pierced herself at her return. The young, when brought forth, are of an ash colour the first year, and are covered with feathers all over. But in time these feathers drop; and those parts which are covered assume a different and more becoming plumage.

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* The Ostrich.—This is one of the few polygamous birds found in a state of nature; one male being generally seen with two or three, and frequently with five, females. The females which are united to one male deposit all their eggs in the same place, to the number of ten or twelve each: these they hatch altogether, the male also taking his turn of sitting on them. Between sixty and seventy eggs have sometimes been found in one nest. The time of incubation is six weeks. From the want of knowledge that the ostrich is polygamous, Linnæus has suffered an error respecting this bird to slip into his Systema Natura, where it is asserted that one female sometimes lays nearly fifty eggs.

Le Vaillant informs us that he started an ostrich from its nest, in Africa, where he found eleven eggs quite warm and four others at a short distance. Those in the nest had young ones in them; but his attendants eagerly caught up the detached ones, assuring him that they were perfectly good to eat. They informed him that near the nest there are always placed a certain number of eggs which the birds do not sit upon, and which are designed for the first nourishment of their future young. "Experience," says M. Le Vaillant, "has convinced me of the truth of this observation, for I never afterwards met with an ostrich's nest without finding eggs deposited in this manner at a small distance from it." Some time after, Le Vaillant found a female ostrich on a nest containing thirty-two eggs, and twelve eggs were arranged at a little distance, each in a separate cavity formed for it. He remained near the place some time, and saw three other females come and alternately seat themselves on the nest; each sitting for about a quarter of an hour, and then giving place to another, who, while waiting, sat close by the side of her whom she was to succeed.—Travels.

† Ostriches of South America impart a lively interest to a ride in the Pampas. They are sometimes seen in coveys of twenty or thirty, gliding elegantly along the undulations of the plain, at half pistol-shot from each other, like skirmishers. The young are easily domesticated, and soon become attached to those who caress them; but they are troublesome inmates; for, stalking about the house, they will, when full grown, swallow coin, shirt-pins, and every small article of metal within reach. Their usual food, in a wild state, is seeds, herbage, and insects; the flesh is a reddish brown, and, if young, not of bad flavour. A great many eggs are laid in the same nest. Some accounts exonerate the ostrich from being the most stupid bird in the creation. This has been proved by the experiment of taking an egg away, or by putting one in addition. In either case she destroys the whole by smashing them with her feet. Although she does not attend to secrecy, in selecting a situation for her nest, she will forsake it if the eggs have been handled. It is also said that she rolls a few eggs thirty yards distant from the nest, and cracks the shells, which, by the time her young come forth, being filled with maggots and covered with insects, form the first repast of her infant brood. The male bird is said to

The beauty of a part of this plumage, particularly the long feathers that compose the wings and tail, is the chief reason that man has been so active in pursuing this harmless bird to its deserts, and hunting it with no small degree of expense and labour. The ancients used those plumes in their helmets; the ladies of the East make them an ornament in their dress; and, among us, our undertakers and our fine gentlemen still make use of them to decorate their hearses and their hats. Those feathers which are plucked from the animal while alive are much more valued than those taken when dead, the latter being dry, light, and subject to be worm-eaten.

Beside the value of their plumage, some of the savage nations of Africa hunt them also for their flesh, which they consider as a dainty. They sometimes also breed these birds tame to eat the young ones, of which the female is said to be the greatest delicacy. Some nations have obtained the name of Struthophagi, or Ostrich-eaters, from their peculiar fondness for this food; and even the Romans themselves were not averse to it. Apicius gives us a receipt for making sauce for the ostrich; and Heliogabalus is noted for having dressed the brains of six hundred ostriches in one dish; for it was his custom never to eat but of one dish in a day, but that was an expensive one. Even among the Europeans now, the eggs of the ostrich are said to be well-tasted and extremely nourishing: but they are too scarce to be fed upon, although a single egg be a sufficient entertainment for eight men.

As the spoils of the ostrich are thus valuable, it is not to be wondered at that man has become their most assiduous pursuer. For this purpose, the Arabians train up their best and fleetest horses, and hunt the ostrich still in view. Perhaps, of all other varieties of the chase, this, though the most laborious, is yet the most entertaining. As soon as the hunter comes within sight of his prey he puts on his horse with a gentle gallop, so as to keep the ostrich still in sight, yet not so as to terrify him from the plain into the mountains. Of all known animals that make use of their legs in running, the ostrich is by far the swiftest. Upon observing himself, therefore, pursued at a distance, he begins to run at first but gently, either insensible of his danger or sure of escaping. In this situation he somewhat resembles a man at full speed; his wings, like two arms, keep working with a motion correspondent to that of his legs; and his speed would very soon snatch him from the view of his pursuers, but, unfortunately for the silly creature, instead of going off in a direct line, he takes his course in circles; while the hunters still make a small course within, relieve each other, meet him at unexpected turns, and keep him thus still employed, still followed for two or three days together. At last, spent with fatigue and famine, and finding all power of escape impossible, he endeavours to hide himself from those enemies he cannot avoid, and covers his head in the sand, or the first thicket he meets. Sometimes, however, he attempts to face his pursuers; and, though in general the most gentle animal in nature, when driven to desperation he defends himself with his beak, his wings, and his feet. Such is the force of his motion, that a man would be utterly unable to withstand him in the shock.

When the Arabians have thus taken an ostrich, they cut its throat, and

take upon himself the rearing of the young. If two cock birds meet, each with a family, they fight for the supremacy over both; for which reason an ostrich has sometimes under his tutelage broods of different ages.—Arcana of Science, 1829.

making a ligature below the opening, they shake the bird, as one would rinse a barrel; then taking off the ligature, there runs out from the wound in the throat a considerable quantity of blood, mixed with the fat of the animal, and this is considered as one of their greatest dainties. They next flay the bird; and of the skin, which is strong and thick, sometimes make a kind of vest, which answers the purposes of a cuirass and a buckler.

There are others who, more compassionate or more provident, do not kill their captive, but endeavour to tame it, for the purposes of supplying those feathers which are in so great request. The inhabitants of Dara and Lybia breed up whole flocks of them, and they are tamed with very little trouble. But it is not for their feathers alone that they are prized in this domestic state; they are often ridden upon, and used as horses.*

The parts of this animal are said to be convertible to many salutary purposes in medicine. The fat is said to be emollient and relaxing; that while it relaxes the tendons, it fortifies the nervous system; and being applied to the region of the loins, it abates the pains of the stone in the kidney. The shell of the egg powdered, and given in proper quantities, is said to be useful in promoting urine, and dissolving the stone in the bladder. The substance of the egg itself is thought to be peculiarly nourishing: however, Galen, in mentioning this, asserts, that the eggs of hens and pheasants are good to be eaten; those of geese and ostriches are the worst of all.†

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* Strength and Swiftness.—Sports and pastimes, which appear to be varied according to situation, the genius of the people, or other circumstances, seem natural to all countries. Thus while an English sportsman is delighted with the chase of the fox, the Greenlander experiences pleasure in pursuing the seal; the inhabitants of New South Wales in coursing the kangaroo; the Arab of the desert feels sensations equally agreeable in following, upon his beautiful steed, the half-flying, half-running ostrich.

During the time of Mr. Adanson's residence at Podor, a French factory on the south side of the Niger, he says, that two ostriches which had been about two years in the factory, afforded him a sight of an extraordinary nature. These gigantic birds though young, were of nearly full size. "They were," he continues, "so tame, that two little blacks mounted both together on the back of the larger. No sooner did he feel their weight than he began to run as fast as possible, and carried them several times round the village; and it was impossible to stop him otherwise than by obstructing his passage. This sight pleased me so much that I wished it to be repeated; and to try their strength directed a full-grown negro to mount the smallest, and two others the larger. This burden did not seem at all disproportioned to their strength. At first they went at a pretty sharp trot; but when they became heated a little, they expanded their wings as though to catch the wind, and moved with such fleetness that they scarcely seemed to touch the ground. Most people have, one time or other, seen the partridge run, and consequently must know that there is no man able to keep up with it; and it is easy to imagine that if this bird had a longer step, its speed would be considerably augmented. The ostrich moves like the partridge with this advantage; and I am satisfied that those I am speaking of would have distanced the swiftest race-horses that were ever bred in England. I have frequently beheld this sight, which is capable of giving one an idea of the prodigious strength of the ostrich, and of showing what use it might be of, had we but the method of breaking and managing, as we do a horse."

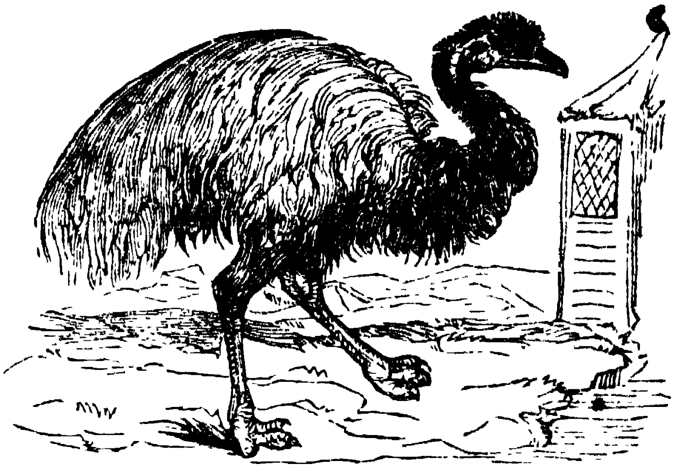
A waggish correspondent in a Sporting Magazine, draws a curious picture of the humorous sight an English foxhunter would afford, running down Reynard straddled on an ostrich.—Ed.

† Error of Naturalists.—In some of our books of natural history it is stated, that the heart and lungs of this bird are separated by a diaphragm; but Mr. Brookes, in a recent lecture at the Zoological Society, on the ostrich which was lately dissected there, stated that the thorax and abdomen were not separated by a diaphragm; and the drawing which he exhibited of the bird confirmed his statement. He also stated as a remarkable fact that the intestinal canal of the ostrich was generally about 80 feet in length, while that of the cassowary was considerably shorter. The rings in the trachea of this bird exceeded 200 in number; its height was more than nine feet. This bird was a female, which had been in the possession of his majesty for about two years; it died of obesity, and, from its appearance, its weight must have been, it is presumed, more than 150 pounds. Many gentlemen partook of the flesh. It has two stomachs; the first is

CHAP V.

THE EMU.

Of this bird, which many call the American ostrich, but little is certainly known. It is an inhabitant of the new continent, and the travellers who have mentioned it, seem to have been more solicitous in proving its affinity to the ostrich than in describing those peculiarities which distinguish it from all others of the feathered creation.


(The Emu.)

It is chiefly found in Guiana, along the banks of the Oroonoko, in the inland provinces of Brazil and Chili, and the vast forests that border on the mouth of the river Plata. Many other parts of South America were known to have them; but as men multiplied, these large and timorous birds either fell beneath their superior power, or fled from their vicinity.

THE EMU, though not so large as the ostrich, is only second to it in magnitude. It is by much the largest bird in the new continent; and is generally found to be six feet high, measuring from its head to the ground. Its legs are three feet long; and its thigh is near as thick as that of a man. The toes differ from those of the ostrich, as there are three in the American bird, and but two

muscular, and appears to act by trituration · in the other there is a gastric liquor.—Arcana of Science, 1828.

The Attachments of Animals from living together have produced several remarkable facts. Feeling has been evinced by those most insensible to feeling, and even the strongest laws of nature have been set aside. "When I lived at Paris," says Mrs. Bowdich, "there were two remarkably fine ostriches, male and female, kept in the Rotunda of the *Jardin du Roi.* The skylight over their heads having been broken, the glaziers proceeded to repair it, and in the course of their work let fall a triangular piece of glass. Not long after this, the female was taken ill, and died after an hour or two of great agony. The body was opened, and the throat and stomach were found to have been dreadfully acerated by the sharp corners of the glass which she had swallowed. From the moment his companion was taken from him, the male bird had no rest; he appeared to be incessantly searching for something, and daily wasted away. He was moved from the spot, in the hope that he would forget his grief; he was even allowed more liberty, but naught availed, and he literally pined himself to death. I heard of a curious expedient the other day, which prevented a similar catastrophe, and which has led me to address you: —A gentleman residing in the country, [illegible] for some years been possessed of two brown cranes; one of them at length died, and the survivor became disconsolate. He was apparently following his companion, when his master introduced a large looking glass into the aviary. The bird no sooner beheld his reflected image than he fancied she for whom he mourned had returned to him; he placed himself close to the mirror, plumed his feathers, and showed every sign of happiness. The scheme answered completely; the crane recovered his health and spirits, passed almost all his time before the looking glass, and lived many years after, at length dying of accidental injury.—Magazine of Natural History.

in the former. Its neck is long, its head small, and the bill flatted, like that of the ostrich: but in all other respects, it more resembles a cassowary, a large bird to be described hereafter. The form of the body appears round; the wings are short, and entirely unfitted for flying, and it wants a tail. It is covered from the back and rump with long feathers, which fall backward, and cover the anus: these feathers are grey upon the back, and white on the belly. It goes very swiftly, and seems assisted in its motion by a kind of tubercle behind, like a heel, upon which, on plain ground, it treads very securely: in its course it uses a very odd kind of action, lifting up one wing, which it keeps elevated for a time; till letting it drop, it lifts up the other. What the bird's intention may be in thus keeping only one wing up, is not easy to discover; whether it makes use of this as a sail to catch the wind, or whether as a rudder to turn its course, in order to avoid the arrows of the Indians, yet remains to be ascertained; however this be, the emu runs with such a swiftness, that the fleetest dogs are thrown out in the pursuit. One of them, finding itself surrounded by the hunters, darted among the dogs with such fury that they made way to avoid its rage; and it escaped by its amazing velocity, in safety to the mountains.

As this bird is but little known, so travellers have given a loose to their imaginations in describing some of its actions, which they were conscious could not be easily contradicted. This animal, says Nierenberg, is very peculiar in the hatching of its young. The male compels twenty or thirty of the females to lay their eggs in one nest; he then, when they have done laying, chases them away, and places himself upon the eggs; however, he takes the singular precaution of laying two of the number aside, which he does not sit upon. When the young ones come forth, these two eggs are addled; which the male having foreseen, breaks one, and then another, upon which multitudes of flies are found to settle; and these supply the young brood with a sufficiency of provision, till they are able to shift for themselves.*

On the other hand, Wafer asserts, that he has seen great quantities of this animal's eggs on the desert shores north of the river Plata: where they were buried in the sand, in order to be hatched by the heat of the climate. Both this, as well as the preceding account, may be doubted; and it is more probable that it was the crocodile's eggs which Wafer had seen, which are undoubtedly hatched in that manner.

When the young ones are hatched, they are familiar, and follow the first person they meet. I have been followed myself, says Wafer, by many of these young ostriches; which, at first, are extremely harmless and simple: but as they grow older, they become more cunning and distrustful, and run so swift that a greyhound can scarcely overtake them. Their flesh, in general, is good to be eaten; especially if they be young. It would be no difficult matter to rear up flocks of these animals tame, particularly as they are naturally so familiar; and they might be found to answer domestic purposes like the hen or the turkey. Their maintenance could not be expensive, if as Narborough says, they live entirely upon grass.

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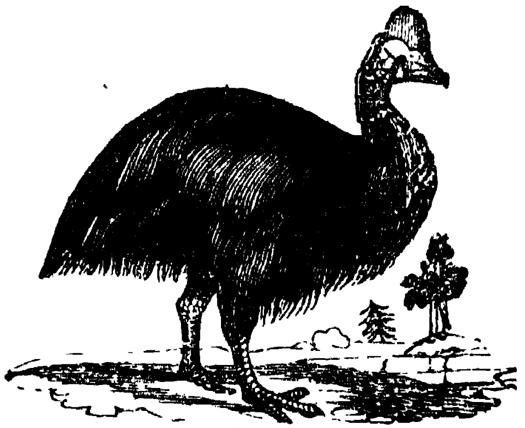
* The Emu.—The only instance I have met with in which the hen bird has not the chief care in hatching and bringing up the young, is in the case of the emus at the farm belonging to the Zoological Society, near Kingston. A pair of these birds has now five young ones: the female at different times dropped nine eggs in various places in the pen in which she was confined. These were collected in one place by the male, who rolled them gently and carefully along with his beak. He then sat upon them himself, and continued to do so with the utmost assiduity for nine weeks, during which time the female never took his place nor was he ever observed to leave the nest. When the young were hatched, he alone took charge of them, and has continued to do so ever since, the female not appearing to notice them in any way. On reading this anecdote, many persons would suppose that the female emu was not possessed of that natural affection for its young which other birds have. In order to rescue it from this supposition, I will mention that a female emu belonging to the Duke of Devonshire, at Chiswick, lately laid some eggs; and as there was no male bird, she collected them together herself and sat upon them.—Arcana of Science, 1833.

CHAP. VI.

THE CASSOWARY.

THE CASSOWARY is a bird which was first brought into Europe by the Dutch from Java, in the East Indies, in which part of the world it is only to be found. Next to the preceding, it is the largest and the heaviest of the feathered species.



(The Cassowary.)

The cassowary, though not so large as the former, yet appears more bulky to the eye; its body being nearly equal, and its neck and legs much thicker and stronger in proportion; this conformation gives it an air of strength and force, which the fierceness and singularity of its countenance conspire to render formidable. It is five feet and a half long, from the point of the bill to the extremity of the claws. The legs are two feet and a half high, from the belly to the end of the claws. The head and neck together are a foot and a half; and the largest toe, including the claw, is five inches long. The claw alone of the least toe, is three inches and a half in length. The wing is so small that it does not appear; it being hid under the feathers of the back.

The part, however, which most distinguishes this animal is the head; this, though small, like that of an ostrich, does not fail to inspire some degree of terror. It is bare of feathers, and is in a manner armed with a helmet of horny substance, that covers it from the root of the bill to near half the head backwards. This helmet is black before and yellow behind. Its substance is very hard, being formed by the elevation of the bone of the skull; and it consists of several plates, one over another, like the horn of an ox. Some have supposed that this was shed every year with the feathers; but the most probable opinion is, that it only exfoliates slowly like the beak. To the peculiar oddity of this natural armour may be added the colour of the eye in this animal, which is a bright yellow, and the globe being above an inch and a half in diameter, give it an air equally fierce and extraordinary. At the bottom of the upper eyelid, there is a row of small hairs, over which there is another row of black hair, which looks pretty much like an eyebrow. The lower eyelid, which is the largest of the two, is furnished also with plenty of black hair. The hole of the ear is very large and open, being only covered with small black feathers. The sides of the head, about the eye and ear, being destitute of any covering, are blue, except the middle of the lower eyelid, which is white. The part of the bill which answers to the upper jaw in other animals, is very hard at the edges above, and the extremity of it like that of a turkey-cock. The end of the lower mandible is slightly notched, and the whole is of a greyish brown, except a green spot on each side. As the beak admits a very wide opening this contributes not a little to the bird's menacing appearance. The neck is of a violet colour, inclining to that of slate; and it is red behind in several places, but chiefly in the middle. About the middle of the neck before, at the rise of the large feathers, there are two processes formed by the skin, which resemble somewhat the gills of a cock, but that they are blue as well as red. The skin which covers the forepart of the breast, on which this bird leans and rests, is hard, callous, and without feathers. The thighs and legs are covered with feathers, and are extremely thick, strong, straight, and covered with scales of several shapes; but the legs are thicker a little above the foot than in any other place. The toes are likewise covered with scales, and are but three in number; for that which should be behind is wanting. The claws are of a hard solid substance, black without and white within.

The same degree of voraciousness which we perceived in the ostrich, obtains as strongly here. The cassowary swallows every thing that comes within the capacity of its gullet. The Dutch assert that it can devour not only glass, iron, and stones, but even live and burning coals, without testifying the smallest fear, or feeling the least injury. It is said that the passage of the food through its gullet is performed so speedily, that even the very eggs which it has swallowed whole pass through it unbroken, in the same form they went down. In fact, the alimentary canal of this animal, as was observed above, is extremely short; and it may happen that many kinds of food are indigestible in its stomach, as wheat or currants are to man, when swallowed whole.

The cassowary's eggs are of a grey ash colour, inclining to green. They are not so large nor so round as those of the ostrich. They are marked with a number of little tubercles of a deep green, and the shell is not very thick. The largest of these is found to be fifteen inches round one way, and about twelve the other.

The southern parts of the most eastern Indies seem to be the natural climate of the cassowary. His domain, if we may so call it, begins where that of the ostrich terminates. The latter has never been found beyond the Ganges; while the cassowary is never seen nearer than the islands of Banda, Sumatra, Java, the Molucca Islands, and the corresponding parts of the continent.*

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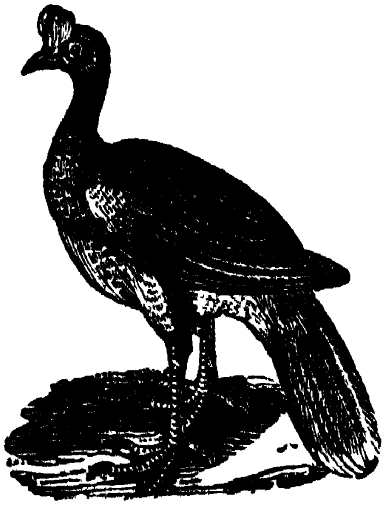
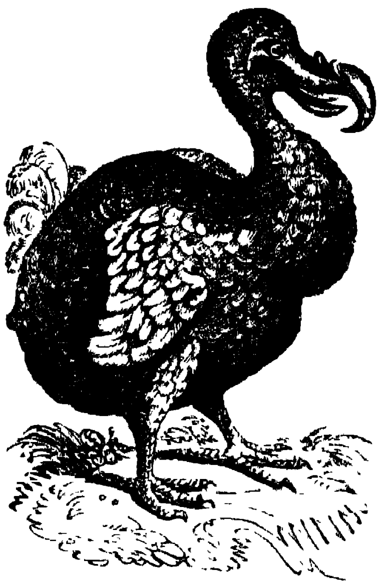
* New Species.—A species of cassowary has been discovered in New Holland: it is seven feet two inches long; the crown of its head is flat, which with the neck and body are covered with bristly feathers, varied with brown and grey; its throat is nakedish, and of a blueish red colour; the feathers of the body are a little incurved at the tip; its wings are hardly visible; its legs are of a brown colour, and its feet with three toes.



CHAP. VII.

THE DODO.*

Mankind have generally made swiftness the attribute of birds; but the DODO has no title to this distinction. Instead of exciting the idea of swiftness by its appearance, it seems to strike the imagination as a thing the most unwieldy and inactive of all nature. Its body is massive, almost round, and covered with grey feathers; it is just barely supported upon two short thick legs like pillars, while its head and neck rise from it in a manner truly grotesque. The neck, thick and pursy, is joined to the head, which consists of two great chaps, that open far behind the eyes, which are large, black, and prominent; so that the animal, when it gapes, seems to be all mouth. The bill, therefore, is of an extraordinary length, not flat and broad, but thick, and of a bluish white, sharp at the end, and each chap crooked in opposite directions. They resemble two pointed spoons that are laid together by the backs. From all this results a stupid and voracious physiognomy; that is still more increased by a bordering of feathers round the root of the beak, and which give the appearance of a hood or cowl, and finish this picture of stupid deformity. Bulk, which in other animals implies strength, in this only contributes



(The Dodo)

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* The Dodo.—The above wood-cut represents a bird, of the existence of whose species a little more than two centuries ago there appears to be no doubt, but which is now supposed to be entirely extinct. It must be obvious that such a fact offers some of the most interesting and important considerations; and the subject, therefore, has claimed the particular attention of several distinguished naturalists The most complete view of the evidence as to the recent existence of the dodo is given in a paper by Mr. Duncan, of New College, Oxford, which is printed in the twelfth number of the Zoological Journal. To this valuable article we are indebted for much of the following account.

There is a painting in the British Museum which was presented to that institution by the late Mr. George Edwards; and the history of it is thus given in his work on birds:—

"The original picture from which this print of the dodo is engraved, was drawn in Holland, *from the living bird*, brought from St Maurice's Island, in the East Indies, in the early times of the discovery of the Indies, by the way of the Cape of Good Hope. It (the picture) was the property of the late Sir Hans Sloane, to the time of his death; and afterwards becoming my property, I deposited it in the British Museum as a great curiosity. The above history of the picture I had from Sir Hans Sloane, and the late Dr. Mortimer, Secretary of the Royal Society."

The evidence of the former existence of this bird does not, however, entirely rest upon this picture and its traditionary history; for if it were so, it would be easier to imagine that the artist had invented the representation of some unknown creature, than that the species should have so utterly become lost within so comparatively short a time. There are three other representations of the dodo which may be called original; for they are given in very early printed books, and are evidently not copied one from the other, although they each agree in representing the sort of hood on the head, the eye placed in a bare skin extending to the beak, the curved and swelling neck, the short heavy body, the small wings, the stumpy legs and diverted claws, and the tuft of rump feathers.

The first of these pictures is given in a Latin work by Clusius, entitled "Caroli Clusii Exoticorum," lib. v. printed in 1605. He says that his figure is taken from a rough sketch in a journal of a Dutch voyager, who had seen the bird in a voyage to the Moluccas, in 1598; and that he himself had seen, at Leyden, a leg of the dodo, brought from the Mauritius.

to inactivity. The ostrich or the cassowary are no more able to fly than the animal before us; but then they supply that defect by their speed in running. The dodo seems weighed down by its own heaviness, and has scarce strength to urge itself forward. It seems among birds what the sloth is among quadrupeds, an unresisting thing, equally incapable of flight or defence. It is furnished with wings, covered with soft ash-coloured feathers, but they are too short to assist it in flying. It is furnished with a tail, with a few small curled feathers; but this tail is disproportioned and displaced. Its legs are too short for running, and its body too fat to be strong. One would take it for a tortoise that had supplied itself with the feathers of a bird; and that thus dressed out with the instruments of flight, it was only still the more unwieldy.

This bird is a native of the Isle of France; and the Dutch, who first discovered it there, called it in their language the *nauseous bird*, as well from its disgusting figure, as from the bad taste of its flesh. However, succeeding observers contradict this first report, and assert that its flesh is good and wholesome eating. It is a silly, simple bird, as may very well be supposed from its figure, and is very easily taken. Three or four dodos are enough to dine a hundred men.

Whether the dodo be the same bird with that which some travellers have described under the bird of Nazareth, yet remains uncertain. The country from whence they both come is the same; their incapacity of flying is the same; the form of the wings and body in both are similar; but the chief difference given is in the colour of the feathers, which in the female of the bird of Nazareth are said to be extremely beautiful; and in the length of their legs, which in the dodo are short; in the other are described as long. Time and future observation must clear up these doubts; and the testimony of a single witness, who shall have seen both, will throw more light on the subject than the reasonings of a hundred philosophers.

The second representation is in Herbert's Travels, published in 1634 We subjoin his description of the bird, which is very quaint and curious:—

"The dodo comes first to our description, here, and in Dygarrois; (and no where else, that ever I could see or heare of, is generated the dodo.) (A Portuguize name it is, and has reference to her simpleness,) a bird which for shape and rareness might be called a Phænix (wer't in Arabia;) her body is round and extreame fat, her slow pace begets that corpulencie; few of them weigh less than fifty pound: better to the eye than the stomack: greasie appetites might perhaps commend them, but to the indifferently curious nourishment, but prove offensive. Let's take her picture: her visage darts forth melancholy, as sensible of nature's injury in framing so great and massie a body to be directed by such small and complemental wings, as are unable to hoise her from the ground, serving only to prove her a bird; which otherwise might be doubted of: her head is variously drest, the one halfe hooded with downy blackish feathers; the other perfectly naked, of a whitish hue, as if a transparent lawne had covered it: her bill is very howked and bends downwards, the thrill or breathing place is in the midst of it; from which part to the end the colour is a light greene mixed with a pale yellow; her eyes be round and small, and bright as diamonds; her cloathing is of finest down, such as you see in goslins: her trayne is (like a China beard) of three or four short feathers; her legs thick, and black, and strong; her tallons or pounces sharp, her stomack fiery hot, so as stones and iron are easily digested in it; in that and shape, not a little resembling the Africk Oestriches; but so much, as for their more certain difference I dare to give thee (with two others) her representation."

In this description there are several details that are no doubt inaccurate; such as the iron-digesting stomach; but the more important particulars agree with other evidence.

The third representation of the dodo is in Willughby's Ornithology, published about the end of the seventeenth century; and this figure is taken from one given in a Latin work on the natural and medical history of the East Indies, published by Jacob Bontius, in 1658. This figure exactly agrees with that of the picture in the British Museum. Our great naturalist Ray, who published in 1676 and 1688, editions of Willughby's work, says, "We have seen this bird dried, or its skin stuffed, in Tradescant's cabinet." Tradescant was a person who had a very curious museum at Lambeth, and in his printed catalogue we find the following item: "Sect. 5. *Whole Birds*. Dodar, from the island Mauritius; it is not able to fly, being so big." Tradescant's specimen afterwards passed into the Ashmolean museum at Oxford, where it is described as existing in 1700; but having become decayed, was destroyed by an order of the visiters in 1755. There is a beak, however, and a leg still preserved in the Ashmolean museum; and there is a foot, also, in the British Museum, which was formerly in the Museum of the Royal Society. We are informed by an eminent naturalist, that the foot at Oxford is much shorter, and otherwise much smaller, than the one in the British Museum, which shows that there must have been two specimens in this country.

Of the former existence, therefore, of the dodo, there appears to be no reasonable doubt; although the representations and descriptions of the bird may, in many respects, be inaccurate. Mr. Duncan, in answer to an application upon the subject made to a gentleman at Port Louis, in the Mauritius, learnt that there is a very general impression among the inhabitants that the dodo did exist at Rodriguez, as well as in the Mauritius itself; but that the oldest inhabitants have never seen it, nor has any specimen, or part of a specimen, been procured in those islands. Mr. Lyell states, in the second volume of his Principles of Geology, that M. Cuvier had showed him in Paris, a collection of fossil bones discovered under a bed of lava in the Isle of France, amongst which were some remains of the dodo, which left no doubt in the mind of that great naturalist that this bird was of the gallinaceous tribe, that is, of the same tribe as the common domestic fowl, the turkey and the peacock.

In a paper "on the natural affinities that connect the orders and families of birds," published in the Transactions of the Linnæan Society, the following observations occur on the dodo:—

"Considerable doubts have arisen as to the present existence of the Linnæan *Didus* (Dodo); and they have been increased by the consideration of the numberless opportunities that have latterly occurred of ascertaining the existence of these birds in those situations, the Isles of Mauritius and Bourbon, where they were originally alleged to have been found. That they once existed I believe cannot be questioned. Besides the descriptions given by voyagers of undoubted authority, the relics of a specimen preserved in the public repository of this country bear decisive record of the fact. The most probable supposition that we can form on this subject is, that the race has become extinct in the before-mentioned islands, in consequence of the value of the bird as an article of food to the earlier settlers, and its incapability of escaping from pursuit. This conjecture is strengthened by the consideration of the gradual decrease of a nearly conterminous group, the *Otis tarda* (bustard) of our British ornithology, which, from similar causes, we have every reason to suspect will shortly be lost to this country. We may, however, still entertain some hopes that the *Didus* may still be recovered in the south-eastern part of that vast continent, hitherto so little explored, which adjoins those islands, and whence, indeed, it seems to have been originally imported into them."

The agency of man, in limiting the increase of the inferior animals, and in extirpating certain races, was perhaps never more strikingly exemplified than in the case of the dodo. That a species so remarkable in its character should become extinct, within little more than two centuries, so that the fact of its existence at all has been doubted, is a circumstance which may well excite our surprise, and lead us to a consideration of similar changes, which are still going on from the same cause. These changes in our own country, where the rapid progress of civilization has compelled man to make incessant war upon many species that gave him offence, or that afforded him food or clothing, are sufficiently remarkable. The beaver was a native of our rivers in the time of the Anglo-Saxons; but being eagerly pursued for its fur, had become scarce at the end of the ninth century, just in the same way as the species is now becoming scarce in North America. In the twelfth century its destruction was nearly complete. The wolf is extirpated, although it existed in Scotland at the end of the seventeenth century. The last bear perished in Scotland in 1057. In Isaak Walton's Angler, published soon after the time of Charles I., we have a dialogue between the angler and a hunter of otters,—a citizen who walked into the neighbourhood of Tottenham, to chase the animal in the small rivers of Middlesex. How rarely is an otter now found! The wild cat and the badger are seldom discovered, although they were formerly common; the wild boar is never heard of. The eagle is now scarcely to be seen, except in the wildest fastnesses of the Highlands; and the crane, the egret, and the stork, who were once the undisturbed tenants of the marshes with which the country was covered, have fled before the progress of cultivation. A single bustard (already mentioned) is now rarely found: they were formerly common in our downs and heaths, in flocks of forty or fifty. The wood-grouse, which about fifty years ago were the tenants of the pine-forests of Scotland and Ireland, are utterly destroyed. Facts such as these may show us that the recent existence, and the supposed extirpation of the dodo, may be supported by well-known examples in our own country. The general subject is full of interest;—and those who wish to pursue it may refer to the ninth chapter of Mr. Lyell's second volume; and to a valuable memoir by Dr. Fleming, in the Edinburgh Philosophical Journal, for October, 1824.

CHAP. VIII.

OF RAPACIOUS BIRDS IN GENERAL.*

THERE seems to obtain a general resemblance in all the classes of nature. As among quadrupeds a part were seen to live upon the vegetable productions of the earth, and another part upon the flesh of each other, so among birds, some live upon vegetable food, and others by rapine, destroying all such as want force or swiftness to procure their safety. By thus peopling the woods with animals of different dispositions, nature has wisely provided for the multiplication of life; since, could we suppose that there were as many animals produced as there were vegetables supplied to sustain them, yet there might still be another class of animals formed, which could find a sufficient sustenance by feeding upon such of the vegetable feeders as happened to fall by the course of nature. By this contrivance, a greater number will be sustained upon the whole; for the numbers would be but very thin, were every creature a candidate for the same food. Thus by supplying a variety of appetites, nature has also multiplied life in her productions.

In thus varying their appetites, nature has also varied the form of the animal: and while she has given some an instinctive passion for animal food, she has also furnished them with powers to obtain it. All land-birds of the rapacious kinds are furnished with a large head, and a strong crooked beak, notched at the end, for the purpose of tearing their prey. They have strong short legs, and sharp crooked talons for the purpose of seizing it. Their bodies are formed for war, being fibrous and muscular; and their wings for swiftness of flight, being well feathered and expansive. The sight of such as prey by day is astonishingly quick; and such as ravage by night have their sight so fitted as to see objects in darkness with extreme precision.

Their internal parts are equally formed for the food they seek for. Their stomach is simple and membranous, and wrapped in fat to increase the powers of digestion; and their intestines are short and glandular. As their food is succulent and juicy, they want no length of intestinal tube to form it into proper nourishment. Their food is flesh, which does not require a slow digestion, to be converted into a similitude of substance to their own.

Thus formed for war, they lead a life of solitude and rapacity. They inhabit, by choice, the most lonely places and the most desert mountains. They make their nests in the clefts of rocks, and on the highest and most inaccessible trees of the forest. Whenever they appear in the cultivated plain, or the warbling grove, it is only for the purposes of depredation; and are gloomy intruders on the general joy of the landscape. They spread terror wherever they approach: all that variety of music which but a moment before enlivened the grove, at their appearing is instantly at an end: every order of lesser birds seek for safety, either by concealment or flight; and some are even driven to take protection with man, to avoid their less merciful pursuers.

It would indeed be fatal to all the smaller race of birds, if, as they are weaker than all, they were also pursued by all; but it is contrived wisely for their safety that every order of carnivorous birds seek only for such as are of the size most approaching their own. The eagle flies at the bustard or the pheasant; the sparrow-hawk pursues the thrush and the linnet. Nature has provided that each species should make war only on such as are furnished with adequate means of escape. The smallest birds avoid their pursuers by the extreme agility rather than the swiftness of their flight; for every order would soon be at an end if the eagle, to its own swiftness of wing, added the versality of the sparrow.

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* RAPACIOUS-BIRDS.—The animals of this order are all carnivorous: they associate in pairs, build their nests in the most lofty situations, and produce generally four young ones at a brood, and the female is mostly larger than the male. They consist of vultures, eagles, hawks, and owls.

Another circumstance, which tends to render the tyranny of these animals more supportable, is, that they are less fruitful than other birds; breeding but few at a time. Those of the larger kind seldom produce above four eggs, often but two; those of the smaller kinds, never above six or seven. The pigeon, it is true, that is their prey, never breeds above two at a time; but then she breeds every month in the year. The carnivorous kinds only breed annually, and, of consequence, their fecundity is small in comparison.

As they are fierce by nature, and are difficult to be tamed, so this fierceness extends even to their young, which they force from the nest sooner than birds of the gentler kind. Other birds seldom forsake their young till able completely to provide for themselves; the rapacious kinds expel them from the nest at a time when they still should protect and support them. This severity to their young proceeds from the necessity of providing for themselves. All animals that, by the conformation of their stomach and intestines, are obliged to live upon flesh and support themselves by prey, though they may be mild when young, soon become fierce and mischievous by the very habit of using those arms with which they are supplied by Nature. As it is only by the destruction of other animals that they can subsist, they become more furious every day, and even the parental feelings are overpowered in their general habits of cruelty. If the power of obtaining a supply be difficult, the old ones soon drive their brood from the nest to shift for themselves, and often destroy them in a fit of fury caused by hunger.

Another effect of this natural and acquired severity is, that almost all birds of prey are unsociable. It has long been observed by Aristotle, that all birds with crooked beaks and talons are solitary: like quadrupeds of the cat kind, they lead a lonely, wandering life, and are united only in pairs by that instinct which overpowers their rapacious habits of enmity with all other animals. As the male and female are often necessary to each other in their pursuits, so they sometimes live together; but, except at certain seasons, they most usually prowl alone; and, like robbers, enjoy in solitude the fruits of their plunder.

All birds of prey are remarkable for one singularity, for which it is not easy to account. All the males of these birds are about a third less, and weaker than the females: contrary to what obtains among quadrupeds, among which the males are always the largest and boldest; from thence the male is called, by falconers, a *tarcel*—that is, a tierce or third less than the other. The reason of this difference cannot proceed from the necessity of a larger body in the female for the purposes of breeding, and that her volume is thus increased by the quantity of her eggs; for in other birds, that breed much faster, and that lay in much greater proportion, such as the hen, the duck, or the pheasant, the male is by much the largest of the two. Whatever be the cause, certain it is that the females, as Willughby expresses it, are of greater size, more beautiful and lovely for shape and colours, stronger, more fierce and generous, than the males—whether it may be that it is necessary for the female to be thus superior, as it is incumbent upon her to provide, not only for herself, but her young ones also.

These birds, like quadrupeds of the carnivorous kind, are all lean and meagre. Their flesh is stringy and ill-tasted, soon corrupting, and tinctured with the flavour of that animal food upon which they subsist. Nevertheless, Belonius asserts that many people admire the flesh of the vulture and falcon, and dress them for eating when they meet with any accident that unfits them for the chase. He asserts that the osprey, a species of the eagle, when young, is excellent food; but he contents himself with advising us to breed these birds up for our pleasure rather in the field than for the table.

Of land birds of a rapacious nature there are five kinds. The eagle kind; the hawk kind; the vulture kind; the horned; the screech-owl kind. The distinctive marks of this class are taken from their claws and beak; their toes are separated; their legs are feathered to the heel; their toes are four in number—three before, one behind; their beak is short, thick, and crooked.

The eagle kind is distinguished from the rest by his beak, which is straight till towards the end, when it begins to hook downwards.

The vulture kind is distinguished by the head and neck; he is without feathers.

The hawk kind by the beak; being hooked from the very root.

The horned owl by the feathers at the base of the bill standing forwards, and by some feathers on the head that stand out, resembling horns.

The screech-owl, by the feathers at the base of the bill standing forward, and being without horns. A description of one in each kind will serve for all the rest.*

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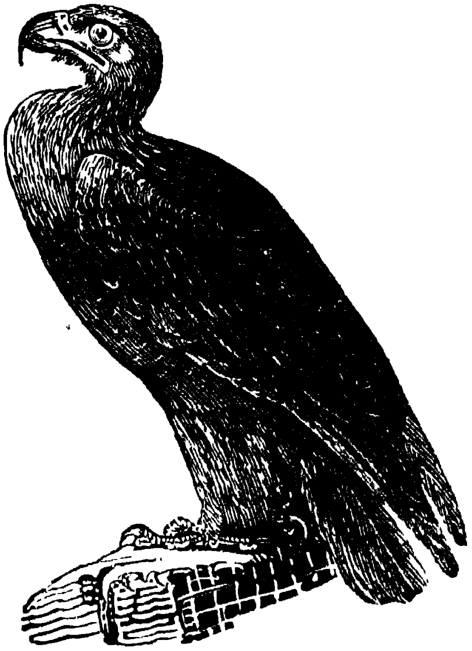
* Pulverizers. — The Mohammedan Arabs of the desert, when they cannot procure water to perform the stated ablutions enjoined by the Koran, have recourse to dry sand, with which they rub their bodies as a substitute; and it is no doubt as a substitute for washing that some birds, thence called pulverizers (*Pulvinatores*), are fond of squatting in dust and hustling it into their feathers. Caged larks may thus be seen rubbing their breasts amongst the dry mould at the side of their withered turf with the utmost eagerness. A hasty observer might perhaps be led to conclude that this was done with the design of looking for insects; but the eye of the bird directed away from the spot and expressive of inward pleasure, would show him that such a conjecture could not be supported. A more familiar instance of pulverizing may be observed in the barn-door fowl, even the unfledged chickens of which we have observed muddling in the dust by instinct, it should seem, as they were too young to have learned the practice from experience or by imitation. Now, had the feathers of these pulverizers been previously smeared with any unctuous matter, such as that in the rump-gland, the dust would have adhered, and thus tended to soil rather than to cleanse them. The design with which these birds hustle amongst dust is supposed to be to suffocate or banish the bird-lice (*Nirmi*), with which most birds are infested; on the same principle as swine wallow in the mire, and as the rhinoceros and elephant in Nubia roll themselves in mud to defend themselves from the terrible breeze-fly called *zimb*. Be this as it may, we have not observed birds, after pulverizing, employed in combing the dust out of their feathers with their bills; they seem, on the contrary, to prefer its remaining.

This curious subject may be illustrated by a circumstance observed by the traveller just quoted, in an eagle (*Gypaëtos barbatus*, Ston) which he shot in Abyssinia. "Upon laying hold," says he, "of his monstrous carcass, I was not a little surprised at seeing my hands covered and tinged with yellow powder or dust. On turning him upon his belly and examining the feathers of his back, they also produced a dust, the colour of the feathers there. This dust was not in small quantities; for, upon striking the breast, the yellow powder flew in full greater quantity than from a hair-dresser's powder-puff. The feathers of the belly and breast, which were of a gold colour, did not appear to have anything extraordinary in their formation; but the large feathers in the shoulder and wings seemed apparently to be fine tubes, which, upon pressure, scattered this dust upon the finer part of the feather; but this was brown, the colour of the feathers of the back. Upon the side of the wing, the ribs or hard part of the feathers seemed to be bare, as if worn; or, I rather think, were renewing themselves, having before failed in their functions. What is the reason of this extraordinary provision of nature, it is not in my power to determine. As it is an unusual one, it is probably meant for a defence against the climate, in favour of birds which live in those almost inaccessible heights of a country doomed, even in its lowest parts, to several months' excessive rain." A powdering of dust, however, we may remark in reference to this conjecture, would seem to be a bad protection against a heavy shower. —Habits of Birds.

CHAP. IX.

THE EAGLE AND ITS AFFINITIES.



(The Golden Eagle.)

THE GOLDEN EAGLE is the largest and the noblest of all those birds that have received the name of Eagle. It weighs above twelve pounds. Its length is three feet; the extent of its wings, seven feet four inches; the bill is three inches long, and of a deep blue colour; and the eye of a hazel colour. The sight and sense of smelling are very acute. The head and neck are clothed with narrow, sharp-pointed feathers, and of a deep brown colour, bordered with tawny; but those on the crown of the head, in very old birds, turn grey. The whole body, above as well as beneath, is of a dark brown; and the feathers of the back are finely clouded with a deeper shade of the same. The wings, when clothed, reach to the end of the tail. The quill feathers are of a chocolate colour, the shafts white. The tail is of a deep brown, irregularly barred and blotched with an obscure ash-colour, and usually white at the roots of the feathers. The legs are yellow, short, and very strong, being three inches in circumference, and feathered to the very feet. The toes are covered with large scales, and armed with the most formidable claws, the middle of which are two inches long.

In the rear of this terrible bird follow the Ring-tailed Eagle, the Common Eagle, the Bald Eagle, the White Eagle, the Rough footed Eagle, the Erne, the Black Eagle, the Osprey, the Sea Eagle, and the Crowned Eagle. These, and others that might be added, form different shades in this fierce family; but have all the same rapacity, the same general form, the same habits, and the same manner of bringing up their young.

In general, these birds are found in mountainous and ill-peopled countries, and breed among the loftiest cliffs. They choose those places which are remotest from man, upon whose possessions they but seldom make their depredations, being contented rather to follow the wild game in the forest than to risk their safety to satisfy their hunger.

This fierce animal may be considered among birds as the lion among quadrupeds; and in many respects they have a strong similitude to each other. They are both possessed of force, and an empire over their fellows of the forest.—Equally magnanimous, they disdain smaller plunder; and only pursue animals worthy the conquest. It is not till after having been long provoked, by the cries of the rook or the magpie, that this generous bird thinks fit to punish them with death: the eagle, also, disdains to share the plunder of another bird, and will take up with no other prey but that which he has acquired by his own pursuits. How hungry soever he may be, he never stoops to carrion; and when satiated, he never returns to the same carcass, but leaves it for other animals, more rapacious and less delicate than he. Solitary, like the lion, he keeps the desert to himself alone: it is as extraordinary to see two pairs of eagles in the same mountain as two lions in the same forest. They keep separate, to find a more ample supply; and consider the quantity of their game as the best proof of their dominion. Nor does the similitude of these animals stop here: they have both sparkling eyes, and nearly of the same colour; their claws are of the same form, their breath equally strong, and their cry equally loud and terrifying. Bred both for war, they are enemies of all society: alike fierce, proud, and incapable of being easily tamed. It requires great patience and much art to tame an eagle; and even though taken young, and brought under by long assiduity, yet still it is a dangerous domestic, and often turns its force against its master.* When brought into the field for the purposes of fowling, the falconer is never sure of its attachment: that innate pride and love of liberty still prompt it to regain its native solitudes; and the moment the falconer sees it, when let loose, first stoop towards the ground and then rise perpendicularly into the clouds, he gives up all his former labour for lost—quite sure of never beholding his late prisoner more. Sometimes, however, they are brought to have an attachment for their feeder: they are then highly serviceable, and liberally provide for his pleasures and support. When the falconer lets them go from his hand, they play about and hover round him till their game presents, which they see at an immense distance, and pursue with certain destruction.

Of all animals the eagle flies highest; and from thence the ancients have given him the epithet of the Bird of Heaven. Of all others, also, he has the quickest eye; but his sense of smelling is far inferior to that of the vulture. He never pursues, therefore, but in sight; and when he has seized his prey, he stoops from his height, as if to examine its weight, always laying it on the ground before he carries it off. As his wing is very powerful, yet, as he has but little suppleness in the joints of the leg, he finds it difficult to rise when down; however, if not instantly pursued, he finds no difficulty in carrying off geese and cranes. He also carries away hares, lambs, and kids; and often destroys fawns and calves to drink their blood, and carries a part of their flesh to his retreat. Infants themselves, when left unattended, have been destroyed by these rapacious creatures; which probably gave rise to the fable of Ganymede's being snatched up by an eagle to heaven.

An instance is recorded in Scotland of two children being carried off by eagles; but fortunately they received no hurt by the way; and, the eagles being pursued, the children were restored unhurt out of the nests to the affrighted parents.

The eagle is thus at all times a formidable neighbour, but peculiarly when bringing up its young. It is then that the female, as well as the male, exert all their force and industry to supply their young, Smith, in his History of Kerry, relates that a poor man in that country got a comfortable subsistence for his family, during a summer of famine, out of an eagle's nest, by robbing the eaglets of food, which was plentifully supplied by the old ones. He protracted their assiduity beyond the usual time by clipping the wings and retarding the flight of the young; and very probably, also, as I have known myself, by so tying them as to increase their cries, which is always found to increase the parent's despatch to procure them provision. It was lucky, however, that the old eagles did not surprise the countryman as he was thus employed, as their resentment might have been dangerous.

It happened some time ago, in the same country, that a peasant resolved to rob the nest of an eagle that had built in a small island in the beautiful lake of Killarney. He accordingly stripped, and swam in upon the island while the old ones were away; and, robbing the nest of its young, he was preparing to swim back, with the eaglets tied in a string; but, while he was yet up to his chin in the water, the old eagles returned, and, missing their young, quickly fell upon the plunderer, and, in spite of all his resistance, despatched him with their beaks and talons.

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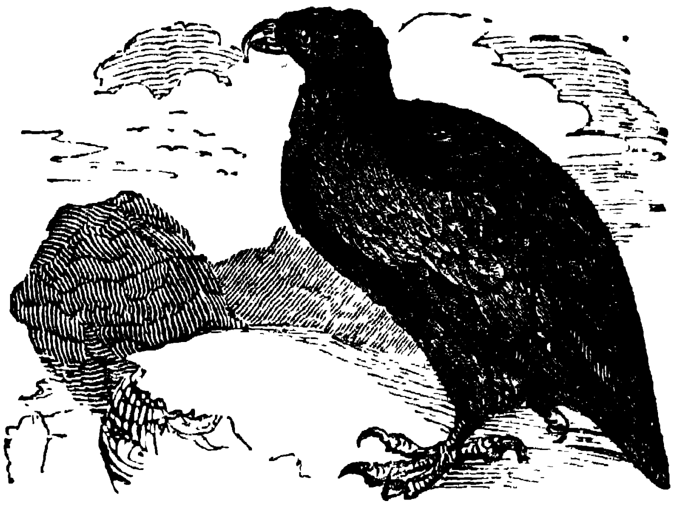
* ANECDOTE.—A gentleman, who lived in the south of Scotland, had, not many years ago, a tame eagle, which the keeper one day injudiciously thought proper, for some petty fault, to lash with a horse-whip. About a week afterwards, the man chanced to stoop within reach of his chain, when the enraged animal, recollecting the late insult, flew in his

In order to extirpate these pernicious birds, there is a law in the Orkney islands which entitles any person that kills an eagle to a hen out of every hou in the parish in which the plunderer is killed.*

The nest of the eagle is usually built in the most inaccessible cliff of the roc and often shielded from the weather by some jutting crag that hangs over it. Sometimes, however, it is wholly exposed to the winds, as well sideways as above; for the nest is flat, though built with great labour. It is said that the same nest serves the eagle during life; and indeed the pains bestowed in forming it seems to argue as much. In this the female eagle deposits her eggs, which seldom exceed two at a time in the larger species, and not above three in the smallest. It is said that she hatches them in thirty days; but frequently, even of this small number of eggs, a part is addled; and it is extremely rare to find three eaglets in the same nest. It is asserted that, as soon as the young ones are somewhat grown, the mother kills the most feeble or the most voracious. If this happens, it must proceed only from the necessities of the parent, who is incapable of providing for their support, and is content to sacrifice a part to the welfare of all.



(The Sea Eagle.)

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face with so much fury and violence, that he was terribly wounded, but was luckily driven so far back with the blow as to be out of all further danger. The screams of the eagle alarmed the family, who found the man lying at some distance covered with blood, and equally stunned with the fright and the fall. The animal was still pacing and screaming in a manner not less formidable than majestic. It was even dreaded whether, in so violent a rage, he might not break loose; which, indeed, fortunately perhaps for them, he did, just as they withdrew, and thus escaped for ever.

* British Eagles.—Eagles are now of rare occurrence in the greater part of the island of Great Britain, the influence of man having expelled them from their pristine haunts. It is only in the remote solitude of the Highlands and isles of the north-west coasts of Scotland, and in the wilds of North Ireland, that they occur in something like the original proportion which, in the wild state of the country, they bore to its other inhabitants. Even there the ingenuity of man has brought havoc among them; but in the inaccessible haunts of the precipitous mountains, and on the awful height of the maritime cliffs, the eagles of the north still rear their young in defiance of all the elements of destruction. Only two species of eagle have been ascertained to reside in this country—these two are the Golden Eagle and White-tailed Eagle.

The *Golden Eagle* is of rarer occurrence than the white-tailed eagle; when of full size, it often measures eight feet from the tip of one wing to the other. Its prey is grouse, hares, lambs, &c., and it nestles in the inland cliffs, making an enormous nest of sticks, heath, grass, wool, and heather. It lays two eggs.

The *White-tailed*, or Cinereous Eagle, is a less active bird than the former, although its equal in strength and size. It is much more common than the other. It feeds on all sorts of carrion, likewish fish. It does not, of course, dive, but pounces on the fish when they come to the surface. In the seas of the northern part of Scotland vast quantities of fish, herring, cod, and dog-fish, come to the surface; and, in shallow rivulets, trout and salmon swarm, an easy capture for this bird. Eagles are very destructive to lambs; but, owing to their unwieldiness and inactivity, they seldom attempt to carry them off, except from an eminence. From a flat surface, an eagle rises with great difficulty, and not until after repeated flappings of its wings, but in the air it exhibits great facility of motion. Nothing can be more splendid than the sweep of an eagle: it is majestic to a degree while scouring the mountains in search of its prey. On these occasions they fly in great circles.

Such are the general characteristics and habitudes of the eagle; however, in some these habitudes differ, as the sea eagle and the osprey live chiefly upon fish, and consequently build their nests on the sea-shore, and by the sides of rivers, on the ground among reeds; and often lay three or four eggs, rather less than those of a hen, of a white elliptical form. They catch their prey, which is chiefly fish, by darting down upon them from above. The Italians compare the violent descent of these birds on their prey, to the fall of lead into water, and call them Aquila Piombina, or the Leaden Eagle.

Nor is the Bald Eagle, which is an inhabitant of North Carolina, less remarkable for habits peculiar to itself. These birds breed in that country all the year round. When the eaglets are just covered with down, and a sort of white woolly feathers, the female eagle lays again. These eggs are left to be hatched by the warmth of the young ones that continue in the nest; so that the flight of one brood makes room for the next that are but just hatched. These birds fly very heavily, so that they cannot overtake their prey, like others of the same denomination. To remedy this, they often attend a sort of fishing-hawk, which they pursue, and strip the plunderer of its prey.[*] This is the more remarkable, as this hawk flies swifter than they. These eagles also generally attend upon fowlers in the winter; and when any birds are wounded, they are sure to be seized by the eagle, though they may fly from the fowler. This bird will often also steal young pigs, and carry them alive to the nest, which is composed of twigs, sticks, and rubbish: it is large enough to fill the body of a cart, and is commonly full of bones half eaten and putrid flesh, the stench of which is intolerable.[†]

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[*] Fishing Birds.—The man of-war birds, or sea-hawks, (*Pelecanus Aquila*,) are seldom or never seen far distant from land; the male birds are black, and have a red pouch; the females have a white breast, and are destitute of the pouch. In procuring fish for their food, these birds prefer seizing it from the boobies and gannets instead of catching it themselves. To attain this object, the sea-hawk hovers about the gannet, (which is the bird most usually selected for attack,) and darting rapidly down, strikes him on the back of the head, which causes him to disgorge his prey, which is seized by the hawk with an inconceivable rapidity before it reaches the water, and he afterwards soars aloft to look out for another object of attack. It is not an uncommon circumstance to observe a single gannet selected from a flock, and come out to be the subject of attack, as if he had been called by the hawk in preference to the others. The gannet, however, manœuvres to avoid the blow by darting about, lowering himself from his elevation in the air at every dart, and raising his beak in a perpendicular direction, eludes the blow of the hawk from behind, and frequently both fall into the water; the hawk only having the advantage over the gannet when hovering in the air, the latter escapes. At the Island of Ascension, where these birds are common, the method practised by the hawks to oblige the gannets to disgorge their prey was tried by a gentleman who lately visited the island: he had seen the attack of the hawk on the gannet, and the successful result. When he visited that part of the island named "the Fan," where these birds congregate in great numbers, he struck some of them with a cane on the back of the head, and the disgorgement of the fish they had swallowed immediately took place.

The use of the pouch in the man-of-war hawk will be an interesting subject for investigation: why it should be found in the male, and not in the female, is curious. One of the officers at the Island of Ascension replied in answer to an inquiry, that the pouch was larger in size during the breeding season. The adjutant-bird of India has also a pouch, which has been the subject of a communication from Dr. Adams, published in the Transactions of the Medical and Physical Society of Calcutta, but his hypotheses are very inconclusive. Mr. Rooke mentioned at Oahu (Sandwich Islands) that he had seen these birds on the reefs, and on his approaching them, they were obliged to disgorge a quantity of half-digested fish before they could rise; they then inflated the pouch to a large size, and running along to windward, soared in the air. The inflation of the pouch is somewhat contradictory to the knowledge we have of the anatomy of the part. The opinion Mr. George Bennett inclined to adopt is, that the pouch may be used during the breeding season to secrete or prepare food for the young: for the present, however, we must consider its use as unknown.—Arcana of Science, 1833.

[†] Mode of Destroying Eagles.—In those parts of the Highlands of Scotland where eagles are numerous, and where they

commit great ravages among the young lambs, the following are the methods used to destroy them :—When the nest happens to be in a place situated in the direction of a perpendicular from the edge of the cliff above, a bundle of dry heath, or grass, inclosing a burning peat, is let down into it. In other cases, a person is let down by means of a rope, which is held above by four or five men, and contrives to destroy the eggs or the young. Sometimes eagles have their nests in places inaccessible without a rope, and instances are known of persons frequenting these nests for the purpose of carrying off the prey which the eagles carry to their young. A very prevalent method to destroy them, is the following:—In a place not far from a nest, or a rock on which eagles repose at night, or on the face of a hill which they are observed to scour in search of prey, a pit is dug, a few feet in depth, of sufficient size to admit a man. The pit is then, covered with sticks and pieces of turf, the latter not cut in the vicinity — eagles, like other cowards, being very wary and cautious, for they do not possess at all the courage attributed to them. A small hole is formed at the end of the pit, through which bristles the muzzle of a gun, while at another end an opening is left to admit a featherless biped. A carcass of a sheep or dog is placed about fifteen yards from the muzzle, and when the eagle pounces on the carrion, he is killed. Multitudes are shot in this manner in Scotland. The head, claws, and quills are kept by the shepherds, to be presented to the steward of the estate, and a premium of four or five shillings is awarded on the occasion.—M'Gillivray—Edin. Lit. Gazette.

Courage of the Eagle.—Of the many absurd stories told of eagles, the following, by Von Buch, is not the least remarkable. "We learned," says he, "with astonishment, that eagles were very much dreaded on these islands; for they are not contented with lambs, and smaller animals, but *even attack oxen and not unfrequently master them!* The manner of their attack is so singular that we should have doubted the truth of the account, if we had not heard it so circumstantially and distinctly confirmed to us, in the same terms, at places a great distance from each other. The eagle plunges itself into the waves, and after being completely drenched, rolls itself among the sand on the shore till its wings are quite covered with sand. It then rises into the air, and hovers over its unfortunate victim. When it is close to it, it shakes its wings, and throws stones and sand into the eyes of the ox, and completes the terror of the animal by blows from its powerful wings. The blinded oxen run about quite raving, and at length fall down completely exhausted, or dash themselves to death from some cliff. The eagle then mangles undisturbed the fruits of its victory."

If this tale be true, the Norwegian eagles must be very different from ours in courage and sagacity; for the British eagles are so cowardly that they do not even venture to defend their nests against a solitary rocksman, dangling upon a rope, like a spider upon a thread, and so weak, that they never attempt to carry off a lamb unless in windy weather and from an eminence. As to eagles plunging into the waves with the view of getting drenched, we are very certain that they would be very sorry to play such pranks; for everybody knows that, for a drenched bird, it is as impossible to fly as for a drunken man to thread a needle.—Ed.

Ring-tail Eagle.—This noble bird, in strength, spirit, and activity, ranks among the first of its tribe. It is found, though sparingly dispersed, over the whole temperate and arctic regions, particularly the latter; breeding on high precipitous rocks, always preferring a mountainous country.

The tail of the feathers of this bird are highly valued by the various tribes of American Indians for ornamenting their calumets, or pipes of peace.

Pennant informs us, that the independent Tartars train this eagle for the chase of hares, foxes, wolves, antelopes, &c., and that they esteem the feathers of the tail the best for pluming their arrows. The ring-tail eagle is characterized by all as a generous, spirited, docile bird; and various extraordinary incidents are related of it.

The ring-tail eagle is found in Russia, Switzerland, Germany, France, Scotland, and in the northern parts of America. As Marco Polo, in his description of the customs of the Tartars, seems to allude to this species; it may be said to inhabit the whole circuit of the arctic regions of the globe. The golden eagle, on the contrary, is said to be found only in the more warm and temperate countries of the ancient continent. Later discoveries, however, have ascertained it to be also an inhabitant of the United States.—American Ornithol.

The Bird of Washington.—To the eagle tribe we may add here a species of sea eagle, which M. Audubon has called the Bird of Washington. He says:—

"It was on a winter's evening, in the month of February, 1814, that, for the first time in my life, I had an opportunity of seeing this rare and noble bird, and never shall I forget the delight it gave me. We were on a trading voyage, ascending the Upper Mississippi,—the keen winter blasts whistled over our heads, and the cold from which I suffered had, in a great degree, extinguished the deep interest which, at other seasons, this river has been wont to awake in me. I lay stretched beside our patroon; the safety of the cargo was forgotten, and the only thing that called forth my attention was the multitude of ducks, of different species, accompanied by vast flocks of swans, which from time to time would pass us. My patroon, a Canadian, had been engaged many years in the fur trade: he was a man of much intelligence, who, perceiving that these birds had engaged my curiosity, seemed only anxious to find some new object to divert me. The sea eagle flew over us. 'How fortunate!' he exclaimed! 'this is what I could have wished. Look, sir! the great eagle, and the only one I have seen since I left the lakes.' I was instantly on my feet, and, having observed it attentively, concluded, as I lost it in the distance, that it was a species quite new to me.

"The sea eagle of America is full one-fourth larger in size than any female specimen of the other kind I ever met with, old or young. In the United States, from Massachusetts to Louisiana on the seaboard, or as high as the mouth of the Missouri to the north-west, (I speak only of the extent of country I have visited, and where I have seen them,) these birds are very rare. This will appear to all, when I say that during my many long peregrinations more than eight or nine I never found, and only one nest. Two years had gone by since the discovery of the nest, in fruitless excursions; but my wishes were no longer to remain ungratified. In returning from the little village of Henderson, to the house of Dr. R——, about a mile distant, I saw one rise from a small inclosure not a hundred yards before me, where the doctor had a few days before slaughtered some hogs, and alight upon a low tree branching over the road. I prepared my double-barrelled piece, which I constantly carry, and went slowly and cautiously towards him;—quite fearless, he awaited my approach, looking upon me with an undaunted eye. I fired, and he fell; before I reached him he was dead. With what delight I surveyed this magnificent bird! Had the finest salmon ever pleased him as he did me? Never. I ran and presented him to my friend. The doctor, who was an experienced hunter, examined the bird with much satisfaction, and frankly acknowledged he had never before seen or heard of it.

"The name I chose for this new species of eagle, 'The Bird of Washington,' may, by some, be considered as preposterous and unfit; but, being indisputably the noblest of the genus known to naturalists, I trust it will be allowed to retain it. To those, however, who may be curious to know my reasons, I can only say, that as the New World gave me birth and liberty, the great man who insured its independence is next to my heart: he had such true nobility of mind, and honest, generous feeling, as is seldom possessed. He was brave—so is the eagle; and his name, extending from pole to pole, resembles the majestic soarings of the mightiest of the feathered tribe.

"The flight of this bird is very different from that of the white-headed eagle, encircling more diameter than the latter;—whilst sailing, keeping nearer to the land and the surface of the water;—and when about to dive for fish, falling in a circuitous spiral manner, as if with an intention of checking all retreating movement which its prey might attempt, and only when within a few yards darting upon it. The fish-hawk often does the same. When rising with a fish, they fly to a considerable distance, forming, in their line of course and that of the water, a very acute angle, something not exceeding thirty degrees, when several hundred yards distant from the spot emerged from.

"The glands containing the oil used for the purpose of lubricating the surface of the plumage were, in the specimen here represented, extremely large; the contents had the appearance of hog's fat which had been melted and become rancid. This bird makes more copious use of that substance than the white-headed eagle, or any of the Falco genus, except the fish-hawk:—the whole plumage looking, upon close examination, as if it had received a general coating of a thin, clear dilution of gum-arabic, and presenting less of the downy gloss exhibited on the upper part of the bald-headed eagle's plumage. The male bird weighs 14½ lbs. avoirdupois; measures 3 ft. 7 in. in length, and 10 ft. 2 in. in extent. The upper mandible 3⅜ in., dark bluish black: it is, however, the same colour for half its length, turning into yellow towards the mouth, which is surrounded with a thick yellow skin. Mouth, blue; tongue, the same; cere, greenish yellow; eye, large, of a fine chestnut colour; iris, black, the whole protected above by a broad, strong, bony, cartilaginous substance, giving the eye the appearance of being much sunk. Lores, lightish blue, with much strong recumbent hair; upper part of the head, neck, back, scapulars, rump, tail coverts, femorals, and tail feathers, dark, coppery, glossy brown; throat, front of the neck, breast, and belly, rich bright cinnamon colour;—the feathers of the whole of which are long, narrow, sharp-pointed, of a hairy texture, each dashed along the centre with the brown of the back; the wings, when closed, reach within an inch and a half of the end of the tail feathers, which are very broad next the body. Lesser coverts, rusty iron grey, forming with that colour an elongated oval, reaching from the shoulders to the lower end of the secondaries, gradually changing to the brown of the back as it meets the scapulars. The secondaries of the last middle

CHAP X

THE CONDOR OF AMERICA

We might now come to speak of the vulture kind, as they hold the next rank to the eagle; but we are interrupted in our method, by the consideration of an enormous bird, whose place is not yet ascertained; as naturalists are in doubt whether to refer it to the eagle tribe, or to that of the vulture. Its great strength, force, and vivacity, might plead for its place among the former; the baldness of its head and neck might be thought to degrade it among the latter. In this uncertainty, it will be enough to describe the bird by the lights we have, and leave future historians to settle its rank in the feathered creation. Indeed, if size and strength combined with rapidity of flight and rapacity, deserve preeminence, no bird can be put in competition with it.*

THE CONDOR possesses, in a higher degree than the eagle, all the qualities that render it formidable, not only to the feathered kind, but to beasts, and even to man himself. Acosta, Garcilasso, and Desmarchais assert, that it is eighteen feet across, the wings extended. The beak is so strong as to pierce the body of a cow; and two of them are able to devour it. They do not even abstain from man himself: but fortunately there are but few of the species; for if there had been plenty, every order of animals must have carried on an unsuccessful war against them. The Indians assert that they will carry off a deer, or a young calf, in their talons, as eagles would a hare or a rabbit; that their sight is piercing, and their air terrible: that they seldom frequent the forests, as they require a large space for the display of their wings; but that they are found on the sea-shore, and the banks of rivers, whither they descend from the heights of the mountains. By later accounts we learn that they come down to the sea-shore only at certain seasons, when their prey happens to fail

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tint. Primaries, brown, darkest in their inner veins, very broad and firm; the outer one 2½ in. shorter than the second; the longest 24 in. to its roots, and about half an inch in diameter at the barrel. The under wing coverts, iron grey, very broad, and forming the same cavity that is apparent in all this genus with the scapulars, which also are very broad. Legs and feet strong and muscular: the former 1½ in. in diameter; the latter measuring, from the base of the hind claw to that of the middle toe, 6½ in. Claws strong, much hooked; the hind one 2 in. long, the inner rather less, all blue, black, and glossy. Toes warty, with rasp-like advancing hard particles, covered with large scales appearing again on the front of the leg, all of dirty strong yellow. Leg feathers brown cinnamon, pointed backwards.

"From the above account, it will be seen that the bird here described and faithfully figured from a fresh-killed specimen, is a very scarce species, even in those parts where it is a native; and, that it is rarely met with, the few opportunities I have had of seeing it, the dates of which I have generally given, are a sufficient proof."—MAGAZINE OF NATURAL HISTORY, vol. i.

[*] THE CONDOR.—It is astonishing that one of the largest of terrestrial birds and animals inhabiting countries which Europeans have been accustomed to visit for more than three centuries, should have so long remained so imperfectly known. The descriptions even of the most modern naturalists and travellers concerning this bird, are replete with contradiction, error, and falsehood. By some the size and ferocity of the condor have been immeasurably exaggerated; others have confounded it with approximating species, or assumed the differences observed in the bird from infancy to age, as the diagnostic characteristics of sex. Baron Cuvier, in speaking of the form of the condor, after a careful investigation of all that has been written, expresses himself thus: "Some authors attribute to the condor a brown plumage, and a head clothed with down; others a fleshy crest on the forehead, and a black and white plumage. It has not yet been described with any precision."—GRIFFITH.

them upon land; that they then feed upon dead fish, and such other nutritious substances as the sea throws up on the shore. We are assured, however, that their countenance is not so terrible as the old writers have represented it; but that they appear of a milder nature than either the eagle or the vulture.

Condamine has frequently seen them in several parts of the mountains of Quito, and observed them hovering over a flock of sheep; and he thinks they would, at a certain time, have attempted to carry one off, had they not been scared away by the shepherds. Labat acquaints us that those who have seen this animal, declare that the body is as large as that of a sheep; and that the flesh is tough, and as disagreeable as carrion. The Spaniards themselves seem to dread its depredations; and there have been many instances of its carrying off their children.*

It is doubted whether this animal be proper to America only, or whether it may not have been described by the naturalists of other countries. It is supposed that the great bird called the roc, described by Arabian writers, and so much exaggerated by fable, is but a species of the condor.† The great bird of Tarnassar, in the East Indies, that is larger than the eagle, as well as the vulture of Senegal, that carries off children, are probably no other than the bird we have been describing. Russia, Lapland, and even Switzerland and Germany, are said to have known this animal. A bird of this kind was shot in France, that weighed eighteen pounds, and was said to be eighteen feet across the wings: however, one of the quills was described only as being larger than that of a swan; so that probably the breadth of the wings may have been exaggerated, since a bird so large would have the quills more than twice as big as those of a swan. However this be, we are not to regret that it is scarcely ever seen in Europe, as it appears to be one of the most formidable enemies of mankind. In the deserts of Pachomac, where it is chiefly seen, men seldom venture to travel. Those wild regions are very sufficient of themselves to inspire a secret horror: broken precipices, prowling panthers, forests only vocal with the hissing of serpents, and mountains rendered still more terrible by the condor, the only bird that ventures to make its residence in those deserted situations.‡

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* Habits.—The condor, like the llama, the vecunna, the alpaca, and several alpine plants, is peculiar to the chain of the Andes. Whenever Baron Humboldt and his friend Bonpland were led, in the course of their herborizing expeditions, to the limits of perpetual snows, they were always surrounded by condors. There they used to find them, three or four in number, on the points of the rocks. They exhibited no distrust, and suffered themselves to be approached within a couple of toises. They did not appear to have the slightest inclination to attack. Humboldt declares that, after the utmost research, he never heard a single example quoted of a condor having carried off a child, as has been so frequently reported. Many naturalists have asserted that condors have killed young persons of both sexes of from ten to twelve years of age. Humboldt does not doubt, however, that two condors would be capable of depriving a child of that age of life, or even a grown man. It is very common to see them attack a bull, and tear out his tongue and eyes. M. de la Condamine, a writer of the utmost credibility, relates that the Indians present to the condor, by way of bait, the figure of an infant, composed of very viscous clay, on which it immediately darts with a very rapid flight, and in which its talons become engaged so that it is unable to extricate them.—Griffith.

† The Roc.—Marco Polo informs us that the roc, a bird of Madagascar, carried up elephants into the air. That writer adds that he believed for a long time, that the roc was a griffin, which, *as every body knows*, is a sort of winged lion, with the head of an eagle. Herodotus was acquainted with ants, which were smaller than some dogs, but larger than some foxes! We must always be upon our guard, even in the present age, against the exaggerated accounts of form and size. Were we to trust to the rash assertions of the inhabitants, we might easily believe that in South America and Egypt there existed crocodiles from thirty to forty feet in length.—Ed.

‡ Tenacity of Life.—This bird appears to be more tenacious of life than any other bird of prey. Humboldt was present at certain experiments on the life of a condor at Riobamba. They first attempted to strangle it with a noose. They hung it to a tree, and dragged the legs with great force for many minutes; but scarcely was the noose removed than the condor began to move about as if

CHAP XI

OF THE VULTURE AND ITS AFFINITIES

(The Vulture.)

THE first rank in the description of birds has been given to the eagle, no because it is stronger or larger than the VULTURE, but because it is more generous and bold. The eagle, unless pressed by famine, will not stoop to carrion; and never devours but what he has earned by his own pursuit. The vulture, on the contrary, is indelicately voracious; and seldom attacks living animals, when it can be supplied with the dead. The eagle meets and singly opposes his enemy; the vulture, if it expects resistance, calls in the aid of its kind, and basely overpowers its prey by a cowardly combination. Putrefaction and stench, instead of deterring, only serve to allure them. The vulture seems among birds, what the jackal and hyæna are among quadrupeds, who prey upon carcasses, and root up the dead.

Vultures may be easily distinguished from all those of the eagle kind, by the nakedness of their heads and necks, which are without feathers, and only covered with a very slight down, or a few scattered hairs. Their eyes are more prominent, those of the eagle being buried more in the socket. The claws are shorter, and less hooked. The inside of the wing is covered with a thick down, which is different in them from all other birds of prey. Their attitude is not so upright as that of the eagle; and their flight more difficult and heavy.

In this tribe we may range the golden, the ash-coloured, and the brown vulture, which are inhabitants of Europe; the spotted and the black vulture of Egypt; the bearded vulture, the Brazilian vulture, and the king of the vultures of South America. They all agree in their nature, being equally indolent, yet rapacious and unclean.

The golden vulture seems to be the foremost of the kind: and is in many things like the golden eagle, but larger in every proportion. From the end of the beak to that of the tail, it is four feet and a half: and to the claws' end, forty-five inches. The length of the upper mandible is almost seven inches; and the tail twenty-seven in length. The lower part of the neck, breast, and belly are of a red colour; but on the tail it is more faint, and deeper near the head. The feathers are black on the back; and on the wings and tail of a yellowish brown. Others of the kind differ from this in colour and dimensions; but they are all strongly marked by their naked heads, and beak straight in the beginning, but hooking at the point.

They are still more strongly marked by their nature, which, as has been observed, is cruel, unclean, and indolent. Their sense of smelling, however, is amazingly great; and nature, for this purpose, has given them two large

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nothing had been the matter. Three pistol-balls were then discharged at him within less than four paces distance. They all entered the body. He was wounded in the neck, chest, and belly, but still remained on his feet. A fifth ball struck against the femur, and rebounding, fell back on the ground. The condor did not die for half an hour after of the numerous wounds which it had received.

apertures or nostrils without, and an extensive olfactory membrane within. Their intestines are formed differently from those of the eagle kind; for they partake more of the formation of such birds as live upon grain. They have both a crop and a stomach, which may be regarded as a kind of gizzard, from the extreme thickness of the muscles of which it is composed. In fact, they seem adapted inwardly, not only for being carnivorous, but to eat corn, or whatsoever of that kind comes in their way.

This bird, which is common in many parts of Europe, and but too well known on the western continent, is totally unknown in England. In Egypt, Arabia, and many other kingdoms of Africa and Asia, vultures are found in great abundance. The inside down of their wings is converted into a very warm and comfortable kind of fur, and is commonly sold in the Asiatic markets.*

"They are attracted by carrion," says Catesby, "from a very great distance.†

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* LOCALITY.—The vultures are more numerous in the southern than in the northern parts of the globe. Still, it does not appear that they dread cold, and seek warmth in preference; for in our part of the world they live in the greatest numbers on the highest mountains, and descend but rarely into the plains. In the hot climates, such as Egypt, where they are very numerous and of great utility, because they clear the surface of the earth of the debris of dead animals, and prevent the ill consequences of putrefaction, they are more frequently seen upon the plain than in the mountains. They approach inhabited places, and spread themselves at daybreak in the towns and villages, and render essential service to the inhabitants by gorging themselves with filth and carrion accumulated in the streets. In our climate the vultures, during the fine season, inhabit the most lofty and deserted mountains. In winter they migrate into a warmer climate.

† VISION OF BIRDS OF PREY.—It always appeared to us most extraordinary, indeed unaccountable, that birds of prey could scent carcasses at such immense distances as they are said to do. We were led to scepticism on this subject some twenty years ago, while observing the concourse of birds of prey from every point of the horizon to a corpse floating down the river Ganges, and that during the north-east monsoon, when the wind blew steadily from one point of the compass for months in succession. It was extremely difficult to imagine that the effluvia from a putrefying body in the water could emanate in direct opposition to the current of air, and impinge on the olfactories of birds many miles distant. Such, however, were the *dicta* of natural history, and we could only submit to the general opinion. We have no doubt, now that we know the general opinion to be something wrong, that it was by means of the optic rather than the olfactory nerves "that the said birds smelled out their suit."

The toucan is a bird which ranks next to the vulture in discerning, either by smell or by sight, the carrion on which it feeds. The immense size of its bill, which is many times larger than its head, was supposed to present in its honeycomb texture an extensive prolongation of the olfactory nerve, and thus to account for its power of smelling at great distances; but on accurate examination, the texture above mentioned in the bill is found to be mere diploe, to give the bill strength. Now the eye of this bird is somewhat larger than the whole brain; and it has been ascertained by direct experiments, that where very putrid carrion was inclosed in a basket from which effluvia could freely emanate, but which concealed the offal from sight, it attracted no attention from vultures and other birds of prey, till it was exposed to their view, when they immediately recognised their object, and others came rapidly from different quarters of the horizon where they were invisible a few minutes before. This sudden appearance of birds of prey from immense distances and in every direction, however the wind may blow, is accounted for by their soaring to an altitude. In this situation their prey on the ground is seen by them, however minute it may be; and therefore their appearance in our sight is merely their descent from high regions of the atmosphere to within the scope of our optics. The toucan in India generally arrives a little in the rear of the vulture, and remains till the larger bird is glutted, while smaller birds of prey, at a still more retired distance, pay similar homage to the toucan.—ARCANA OF SCIENCE, 1831.

Ross, in his voyage to Baffin's Bay, proved that a man, under favourable circumstances, could see over the surface of the ocean, to the extent of 150 English miles. It is not probable that any animal exceeds this power of vision, though birds, perhaps, excel men and most quadrupeds in sharpness of sight. Schmidt threw at a considerable distance from a thrush (Turdus musicus) a few small beetles of a pale grey colour, which the unassisted human eye could not discover, yet the thrush observed them immediately and devoured them. The long tailed titmouse (Parus caudatus) flits with great quickness among the branches of trees, and finds on the very smooth bark its particular food

It is pleasant to behold them, when they are thus eating, and disputing for their prey. An eagle generally presides at these entertainments, and makes them all keep their distance till he has done. They then fall to with an excellent appetite: and their sense of smelling is so exquisite, that the instant a carcass drops, we may see the vultures floating in the air from all quarters, and come sousing on their prey." It is supposed by some, that they eat nothing that has life; but this is only when they are not able: for when they can come at lambs, they show no mercy, and serpents are their ordinary food. The manner of those birds is to perch themselves, several together, on the old pine and cypress trees; where they continue all the morning, for several hours, with their wings unfolded: nor are they fearful of danger, but suffer people to approach them very near, particularly when they are eating.

These birds, at least those of Europe, usually lay two eggs at a time, and produce but once a year.* They make their nests in inaccessible cliffs, and in places so remote that it is rare to find them. Those in our part of the world chiefly reside in the places where they breed, and seldom come down into the plains, except when the snow and ice in their native retreats, have banished all living animals but themselves: they then come from their heights, and brave the perils they must encounter in a more cultivated region. As carrion is not found, at those seasons, in sufficient quantity, or sufficiently remote from man to sustain them, they prey upon rabbits, hares, serpents, and whatever small game they can overtake or overpower.

Such are the manners of this bird in general; but there is one of the kind, called the King of the Vultures, which, from its extraordinary figure, deserves a separate description.† This bird is a native of America, and not of the East

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where nothing is perceptible to the naked eye, though insects can be detected there by the microscope. A very tame redbreast (Sylvia Rubecula) discovered flies from the height of the branch where it usually sat, at the distance of 18 ft from the ground, the instant they were thrown down; and this, by bending its head to one side, and using, of course, only one eye. At the same distance a quail discovered with one eye some poppy seeds, which are very small and inconspicuous.—FROM THE GERMAN.

* EGGS.—Authors are not agreed as to the number of their eggs, some stating it at two, others more. They do not carry food for their young in their talons, like the eagles, which even tear their prey in the air to distribute it to their family; but they fill their crop, and then disgorge the contents into the beaks of the little ones.

† KING BIRDS.—Authors also tell us that the quails have a king to conduct their migrations; and it is further pretended that they are shrewd enough not to select for a monarch one from their own body, but make choice of a land-rail (*Ortygometra Crex*); for upon coming to their place of destination, the first of the band usually falls a victim to some bird of prey that is waiting their arrival, and foreseeing this the quails contrive to provide a victim from another species. Such legends, as Buffon well remarks, by ascribing incredible sagacity and design to birds, give us good room to doubt whether the authors themselves possess any great share. As the land-rail, however, migrates about the same period with the quails, this is not quite so extravagant a notion as that recorded by Aristotle, that the quails are led by an owl (ωτος), as their king.

M Vaillant remarks, that the idea of these king-birds seems to have originated from the casual observation of a strange species among a flock of gregarious birds. Thus the Dominican widow-bird (*Fringilla Serena*, ILLIGER) is at the Cape called the king of the Bengal sparrows (*Passer Bengalensis*, BRISSON), and of the wax-billed finches (*Fringilla undulata*, PALLAS). Vaillant once observed a few crossbills (*Loxia curvirostra*) in the king's garden at Paris, intermingling with other gregarious birds. These being uncommon birds were very likely to attract popular attention, and give rise to the fancy of their being royal birds. He once also observed a fieldfare (*Turdus pilaris*), which, having strayed from its companions, and associated with starlings, was called king of the starlings by the peasants of Sezaune, in La Brie. It is in this way that M. Vaillant accounts for the origin of the name of the king-bird of Paradise (*Paradisea regia*), of which so many legends are current in the islands of Arrou in the Eastern Archipelago, where these birds are indigenous. It is averred, for example, that the two principal species of Paradise birds (*P. Apoda* and *P. Magnifica*) have each their leader, whose imperial mandates are received with submissive obedience by a numerous train of subjects; and that his majesty always flies above the flock to issue his orders for inspecting and tasting the

Indies, as those who make a trade of showing birds would induce us to believe. This bird is larger than a turkey-cock; but is chiefly remarkable for the odd formation of the skin of the head and neck, which is bare. This skin arises from the base of the bill, and is of an orange colour; from whence it stretches on each side to the head; from thence it proceeds, like an indented comb, and falls on either side, according to the motion of the head. The eyes are surrounded by a red skin of a scarlet colour, and the iris has the colour and lustre of pearl. The head and neck are without feathers, covered with a flesh-coloured skin on the upper part, a fine scarlet behind the head, and a duskier coloured skin before: farther down behind the head, arises a little tuft of black down, from whence issues and extends beneath the throat, on each side, a wrinkled skin, of a brownish colour, mixed with blue, and reddish behind: below, upon the naked part of the neck, is a collar formed by soft longish feathers, of a deep ash-colour, which surround the neck, and cover the breast before. Into this collar the bird sometimes withdraws its whole neck, and sometimes a part of its head; so that it looks as if it had withdrawn the neck into the body. Those marks are sufficient to distinguish this bird from all others of the vulture kind; and it cannot be doubted, but that it is the most beautiful of all this deformed family: however, neither its habits nor instincts vary from the rest of the tribe; being, like them, a slow cowardly bird, living chiefly upon rats, lizards, and serpents; and upon carrion or excrement, when it happens in the way. The flesh is so bad that even savages themselves cannot abide it.

springs of water where they may drink with safety; the Indians being in the practice of taking whole flocks of birds by poisoning the water where they resort to drink. M. Vaillant's explanation accords with the account given by M. Sonnerat of the manners of the king-bird of Paradise; for being a solitary bird, going from bush to bush in search of the berries upon which it feeds, it may occasionally be seen near the flocks of those which are gregarious, where its singular plumage must render it conspicuous.

The same remark will apply no less forcibly to the king of the vultures (*Sarcoramphus papa*, Dumeril), which is seldom seen congregating in flocks, but of whom one or two solitary birds will intermingle with the Turkey buzzard (*Catharista aura*, Vieillot), and of course appear conspicuous among them from their more striking form and colours.

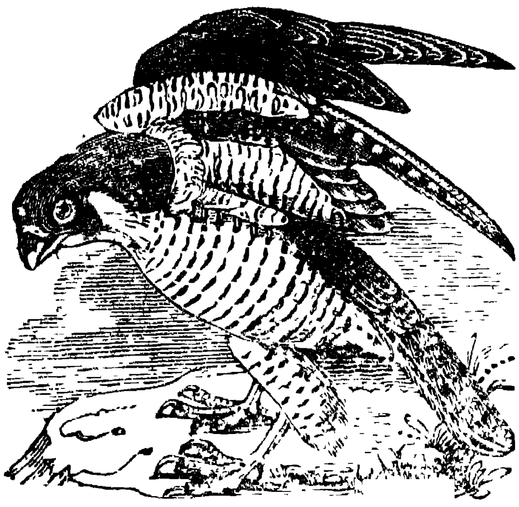
It is not improbable that similar solitary habits in the lion and the eagle, together with their magnitude and their strength, have given origin to the titles of king of the beasts and king of the birds, current all over the world. "The eagle," says Jonston, "challengeth the first place, not that it is the best dish at table, for none will eat it, but because it is the king of the birds." The ancient Greeks used the same term, as we find Pindar talking of "the great eagle, the chief magistrate of the birds." Josephus, the Jewish historian, also, says the eagle was selected for the Roman legionary standards, because he is "the king of all the birds and the most powerful of them all, whence he has become the emblem of empire and the omen of victory;" and this conclusion is singularly enforced by Aldrovand, who tells us that the eagle "challenges dragons to battle and fights with them; attacks bulls and slays them;" adding the anticlimax that "he overcomes leverets; tears foxes, and feeds upon snakes."

"Caius Marius," says Pliny, "in his second consulship, ordained that the legions of Roman soldiers only should have the eagle for their standard, and no other ensign; for beforetime the eagle marched foremost indeed, but in a rank of four others, to wit of wolves, minotaurs, horses, and boars, which were borne each one before their own several squadrons and companies. Not many years past, the standard of the eagle alone began to be advanced into the field to battle, and the rest of the ensigns were left behind in the camp; but Marius rejected them altogether, and had no use for them at all. And ever since this is observed ordinarily, that there was no standing camp or leaguer wintered at any time without a pair of eagle standards."

Josephus and Pliny, however, were wrong if they thought the ensign of the eagle peculiar to the Romans; for the golden eagle with extended wings was borne by the Persian monarchs, from whom it is probable the Romans adopted it, as it was subsequently adopted from them by Napoleon and the United States; while the Persians themselves may have borrowed the symbol from the ancient Assyrians, in whose banners it waved till Babylon was conquered by Cyrus. This may serve to explain why the expanded eagle is so frequently alluded to in the prophetical books of Scripture. Referring, for example, to the king of Babylon, Hosea says, "he shall come as an eagle;" and Ezekiel describes Nebuchadnezzar as "a great eagle, with great wings, long-winged, full of feathers which had divers colours;" and the king of

CHAP. XII.

OF THE FALCON KIND AND ITS AFFINITIES.[*]



(The Peregrine Falcon.)

EVERY creature becomes more important in the history of nature in proportion as it is connected with man. In this view the smallest vegetable, or the most seemingly contemptible insect, is a subject more deserving attention than the most flourishing tree, or the most beautiful of the feathered creation. In this view, the **FALCON** is a more important animal than the eagle or the vulture; and though so very diminutive in the comparison, is notwithstanding, from its connexion with our pleasures, a much more interesting object of curiosity.

The amusement of hawking, indeed, is now pretty much given over in this kingdom; for as every country refines, as its inclosures become higher and closer, those rural sports must con-

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Egypt as "another great eagle, with great wings and many feathers." It was, no doubt, on the same account that the eagle was assigned in the ancient mythologies as the bird of Jove, a notion which Lucian with his usual satire ridicules without mercy, making Momus tell Jupiter he may think himself well off if it do not take a fancy to build a nest on his head

So far as size and appearance are concerned, as well as in power of flight, the eagle (*Aquila chrysaetos*, KLEIN) must yield the palm to the condor of America (*Sarcoramphus gryphus*, DUMERIL), while the head of the latter, "the likeness of a kingly crown has on." The condor, however, has not the honour of ranking among eagles, being evidently, both from structure and habits, nothing but a vulture.—HABITS OF BIRDS.

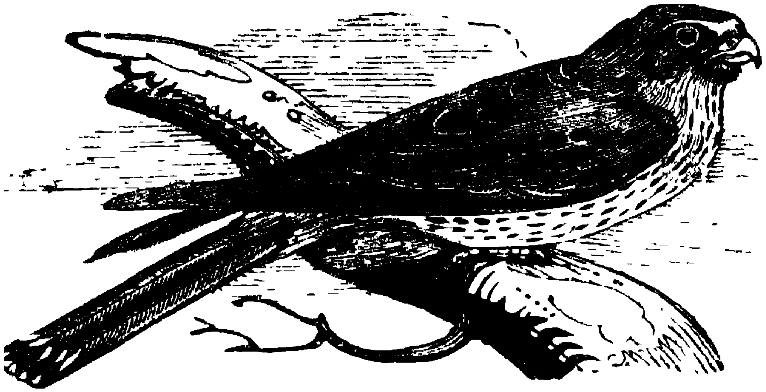
[*] **THE FALCON KIND.**—These species are divided into the long-winged and the short-winged.

Of the former, the *Gyr-falcon* holds a most conspicuous place. It is in size between a vulture and a hawk, and may be fairly said to rank next to the eagle, possessing very great strength. Much patience is required to reclaim her, on account of the fierceness and hardiness of her nature; but when once overcome by judicious treatment, she proves a most excellent hawk Iceland is the native country of this species, from whence arises its name of *Islandicus*. It was from this island that the royal falconers of Denmark and other northern kingdoms were supplied with their choicest casts of hawks. It breeds in the highest and most inaccessible rocks, and preys upon the larger species of game and wild fowl, also on hares, &c.

THE GOSHAWK.—Of the generous tribe of hawks, the goshawk claims our attention. It is a powerful bird of the short-winged kind and is distinguished by a small head, a large throat, great eyes, long thighs, and large pounces and talons. This bird is rather rare in England. In the wild districts of Scotland and the Orkneys it breeds in safety. The goshawk preys on the pheasant, mallard, wild goose, hare, and coney, and is remarkably courageous: it is even said to prey on its own young. It is considered by falconers as the best and most courageous of the short-winged hawks.

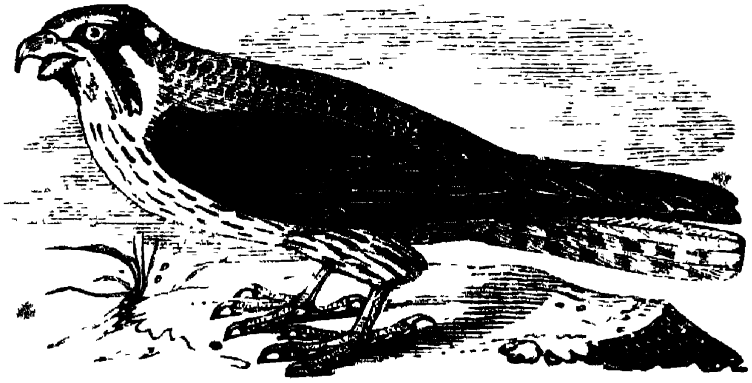
(The Goshawk.)

THE HOBBY is a hawk of high flight, and



KESTREL.

GYR-FALCON.



HOBBY.

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sequently decline, in which the game is to be pursued over a long extent of country, and where, while every thing retards the pursuer below, nothing can stop the object of his pursuit above.

is, with justice called the ***daring hobby;*** for she is not only nimble and light of wing, but boldly encounters kites, buzzards, &c. The hobby is chiefly used for the lark, which poor little bird so dreads the sight of her soaring, that she chooses to be taken by the hand, rather than strive to escape in flight from its pursuer. Partridges and quails are likewise victims of its courage and rapacity. Possessing a great length and power of wing, the flight of the hobby is wonderfully rapid, and can be supported with undiminished vigour for a considerable time. This bird makes excellent sport with nets and spaniels; for when the dogs range the field to spring the fowl, the hobby soars aloft over them, and the timid birds dare not commit themselves to their wings, but think it safer to lie close, and so are taken in the toils. This is called *daring* When hawking was keenly followed, the hobby was trained to the pursuit of young partridges, snipes larks, &c.

THE SPARROW-HAWK is a short-winged hawk, yet generally speaking, deserves the character of being a very good sportsman after that species of game her strength will give her power to kill. This destructive species is remarkable for the difference in size between the male and female. The latter exceeds the former by three inches, and from her superior size, is a fatal enemy to partridges and other game. The sparrow-hawk is common to every country of Europe.

THE FALCON-GENTLE.—This bird, long accounted distinct, is nothing more than the young of the goshawk. It is a hot, hasty bird, apt to miss its quarry, and to fly at the first fowl she may list, even a crow or old pie.

THE KESTREL is one of our common indigenous species, widely spread through the kingdom. It preys on mice, &c and is easily reclaimed, and trained to pursue snipes, larks, &c.

THE MERLIN is one of the very smallest of its species, but redolent of courage; it has been known to kill a partridge at a single blow. Its flight is low and rapid, and may be seen skimming along the sides of hedges in search of its prey.

THE PEREGRINE FALCON.—This beautiful species is about sixteen inches and a half in length; breadth about thirty-seven. From its nature, the peregrine falcon is limited to certain districts, choosing only mountainous parts where it can settle in security in the midst of plenty. In daring disposition the noble bird equals or surpasses most of its congeners. The anecdotes related of the dexterity and prowess of this bird are innumerable; a writer in a popular periodical describes one pursuing a razor-bill, which, instead of assaulting as usual, with the death pounce from the beak, he seized with his claw the head, and made towards land, the prisoner screaming lustily; but being a heavy bird, he so far overbalanced the aggressor, that both descended fast towards the sea, when just as they touched the water, the falcon let go his hold and ascended, the razor-bill as instantaneously diving below.

The flight of a strong falcon is wonderfully swift. It is recorded that a falcon, belonging to a Duke of Clare, flew out of Westphalia into Prussia in one day; and in the county of Norfolk, a hawk has made a flight at a woodcock, near thirty miles in one hour. But what are these to the actual velocity and continuance of flight of a falcon, that is recorded to have belonged to Henry the Fourth at Fontainbleau, which escaped from that place, and in less than twenty-four hours after, was found in Walla, a space computed to be no less than 1,350 miles, a velocity equal to fifty-seven miles in an hour, supposing the hawk to have been on the wing the whole time. But as such birds never fly by night, and allowing the day to be the longest, this would make 75 miles an hour.

Those who have attended to the flight of birds, know that a sparrow will fly thirty miles an hour. Colonel Thornton, speaking of a falcon's flight in pursuit of a snipe, calculates the space of nine miles in eleven minutes, independent of the numerous turns; and the force with which they strike in the utmost of their velocity is so great, that he has known a hawk belonging to him, cut a snipe into two parts. A hawk will occasionally fly at the rate of 150 miles in an hour; the common crow, 25 ditto; a swallow, 92 ditto, and a swift three times greater. Migratory birds average 50 miles an hour. Amongst quadrupeds, the horse is perhaps as fleet as any, and yet the velocity falls very far short of a bird. The famous racer, Hambletonian, covered a space of four miles in eight minutes, which is but 30 miles if continued. Eclipse is said to have gone at the rate of a mile in a minute, for a very short distance. The velocity of fishes is not, perhaps equal to that of quadrupeds, but it can be continued. The whale has been calculated by Le Rede, to swim at the rate of 33 feet in a second of time, which is about 22 miles an hour; and if continued, might circumnavigate the globe at the equator in about 46 days, including nights; whereas a bird, at the rate of 100 miles an hour, would effect the same distance in about ten days, ten hours. How admirably then is the feathered tribe calculated to migrate and re-migrate to and from distant climes.

Falconry, that is now so much disused among us, was the principal amusement of our ancestors. A person of rank scarce stirred out without his hawk on his hand, which in old paintings is the criterion of nobility. Harold, afterwards king of England, when he went on a most important embassy into Normandy, is drawn in an old bas-relief, as embarking with a bird on his fist, and a dog under his arm.* In those days, it was thought sufficient for noblemen's sons to wind the horn, and to carry their hawk fair, and leave study and learning to the children of meaner people. Indeed, this diversion was in such high esteem among the great all over Europe, that Frederic, one of the emperors of Germany, thought it not beneath him to write a treatise upon hawking.

The expense which attended this sport was very great: among the old Welsh princes, the king's falconer was the fourth officer in the state; but, notwithstanding all his honours, he was forbid to take more than three draughts of beer from his horn, lest he should get drunk and neglect his duty. In the reign of James the First, Sir Thomas Monson is said to have given a thousand pounds for a cast of hawks; and such was their value in general, that it was made felony in the reign of Edward the Third to steal a hawk. To take its eggs, even in a person's own ground, was punishable with imprisonment for a year and a day, together with a fine at the king's pleasure. In the reign of Elizabeth, the imprisonment was reduced to three months; but the offender was to lie in prison till he got security for his good behaviour, for seven years farther. In the earlier times, the art of gunning was but little practised, and the hawk then was valuable, not only for its affording diversion, but for its procuring delicacies for the table that could seldom be obtained any other way.

Of many of the ancient falcons used for this purpose, we at this time know only the names, as the exact species are so ill described, that one may be very easily mistaken for another. Of those in use at present, both here and in other countries, are the gyr-falcon, the falcon, the lanner, the sacre, the hobby, the kestrel, and the merlin. These are called the long-winged hawks, to distinguish them from the goshawk, the sparrow-hawk, the kite, and the buzzard, that are of shorter wing, and either too slow, too cowardly, too indolent or too obstinate, to be serviceable in contributing to the pleasures of the field.†

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* HAWKING.—Professional falconers have been for many years natives of the village of *Falconsward*, near Bois le Duc, in Holland. A race of them was there born and bred, whence supplies have been drawn for the service of all Europe; but as there has been no sufficient inducement for the young men to follow the employment of their forefathers, numbers are dead or worn out; and there only remains John Pells, now in the service of John Dawson Downes, Esq., of Old Gunton Hill, Suffolk.

The hawks which have been trained for the field are the slight falcon and the goshawk, which are the species generally used in falconry. The former is called a long-winged hawk, or one of the *lure;* the latter a short-winged hawk, or one of the *fist*.

The Icelander is the largest hawk that is known, and highly esteemed by falconers, especially for its great powers and tractable disposition. The gyr-falcon is less than the Icelander, but much larger than the slight falcon. These powerful birds are flown at herons and hares, and are the only hawks that are fully a match for the fork-tailed kite. The merlin and hobby are both small hawks, and fit only for small birds, as the blackbird, &c. The sparrow-hawk may be also trained to hunt: his flight is rapid for a short distance, kills partridges well in the early season, and is the best of all for landrails.

The slight falcon takes up his abode every year, from October and November until the spring, upon Westminster Abbey, and other churches in the metropolis. This is well known to the London pigeon-fanciers, from the great havoc he makes in their flights.—ARCANA OF SCIENCE, 1829.

† HAWKING TERMS.—The ancient books of hawking assign to the different ranks of persons the sort of hawk proper to be used by them; and they are placed in the following order:

The eagle, the vulture, and the merloun, for an emperor.

The gyr-falcon, and the tercel of the gyr-falcon for a king.

The falcon gentle and the tercel gentle, for a prince.

The falcon of the rock, for a duke.
The falcon peregrine, for an earl.
The bastard, for a baron.
The sacre, and the sacret, for a knight.
The lanere, and the laneret, for an esquire.
The marlyon, for a lady.

The generous tribe of hawks, as was said, are distinguished from the rest by the peculiar length of their wings, which reach nearly as low as the tail. In these the first quill of the wing is nearly as long as the second; it terminates in a point which begins to diminish from about an inch of its extremity. This sufficiently distinguishes the generous breed from that of the baser race of kites, sparrow-hawks, and buzzards, in whom the tail is longer than the wings, and the first feather of the wing is rounded at the extremity. They differ also in the latter having the fourth feather of the wing the longest; in the generous race it is always the second.

This generous race, which have been taken into the service of man, are endowed with natural powers that the other kinds are not possessed of. From the length of their wings, they are swifter to pursue their game: from a confidence in this swiftness, they are bolder to attack it; and from an innate generosity, they have an attachment to their feeder, and consequently a docility which the baser birds are strangers to.

The gyr-falcon leads in this bold train.* He exceeds all other falcons in the largeness of his size, for he approaches nearly to the magnitude of the eagle. The top of the head is flat and of an ash colour, with a strong, thick, short, and

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The hobby, for a young man.
The goshawk, for a yeoman.
The tercel, for a poor man.
The sparrow-hawk, for a priest.
The musket for a holy water clerk.
The kesterel, for a knave or servant.

And this list includes, I presume, the greater part, if not all, of the names appertaining to the birds used in hawking.—STRUTT'S SPORTS AND PASTIMES.

* SPEED AND COURAGE OF FALCONS.—It is difficult to estimate the comparative rapidity of flight in different birds, and our pigeons may appear to possess this advantage in a degree little inferior to the true falcons; but these birds are deficient in natural courage, and are unable under certain circumstances, to avail themselves of those powers with which they are gifted. The bodies of all the species of true falcons, when denuded of their feathers, are triangular in form, broad at the shoulders, and tapering gradually to the tail; the muscles of the thighs and legs of great size; but these characters are less prominent in the hawks, the bodies of which are more lengthened, the legs long and slender, the pectoral muscles smaller, the wing rounded in form, &c. These two divisions of the genus *Falco,* although the latter are unequal to the former in powers, are remarkable for their bold character and rapid flight, their invariable mode of striking their prey on the wing, as well as the instinctive knowledge by which they are directed to destroy life, attacking the most vital part, and penetrating the brain with their sharp, hooked beak, either by one of the orbits where the bone is very thin, or at the junction of the cervical vertebræ with the occiput. —YARREL *on the Anatomy of Birds of Prey.*

POWER OF VISION.—The extraordinary powers of vision which birds are known to exercise beyond any other class of animals, is in no genus more conspicuous than in that of *Falco.* Their destination elevating themselves, as they occasionally do, into the highest regions, and the power required of perceiving objects at very different distances, and in various directions, as well as the rapidity of their flight, seem to render such a provision necessary. The eyes of birds are much larger in proportion than those of quadrupeds, and exhibit also two other peculiarities. The one is the marsupium, a delicate membrane arising at the bottom of the eye, and terminating at or near the edge of the crystalline lens; the other is a ring of thin, bony plates, enveloped by the seletoric coat. Comparative anatomists do not seem to be agreed as to the means by which birds obtain their power of vision, whether by an alteration in the form or situation of the chrystalline lens, or by both; either or both of which, the greater quantity of aqueous humour which birds are known to possess, would seem to facilitate. The existence of a muscle attached to the inner surface of the bony hoop of the selerotica, and inserted by a tendinous ring into the internal surface of the cornea, by which the convexity of the cornea may be altered, gives a still greater scope of action, since with two, or at the utmost three, varieties of powers, the sphere of distinct vision may be indefinitely extended. Whether the five species called the true falcons, possess with their exclusive rapidity of flight, any power of vision beyond their generic companions, would be difficult to ascertain; but it may, while on this subject, be worthy of remark, that the irides of the *gyr-falcon, peregrine, hobby, merlin,* and *kestrel,* are hazel brown, or still darker, while those of all the hawks, buzzards, harriers, and kites are of various shades of yellow. I refer only to adult birds, and do not remember a single exception.—YARREL *on Birds of Prey,* ZOOLOGICAL JOURNAL.

blue beak. The feathers of the back and wings are marked with black spots, in the shape of a heart; he is a courageous and fierce bird, nor fears even the eagle himself; but he chiefly flies at the stork, the heron, and the crane. He is mostly found in the colder regions of the north, but loses neither his strength nor his courage when brought into the milder climates.

The falcon, properly so called, is the second in magnitude and fame. There are some varieties in this bird; but there seem to be only two that claim distinction; the falcon-gentil and the peregrine-falcon; both are much less than the gyr, and somewhat about the size of a raven. They differ but slightly, and perhaps only from the different states they were in when brought into captivity. Those differences are easier known by experience than taught by description. The falcon-gentil moults in March, and often sooner; the peregrine-falcon does not moult till the middle of August. The peregrine is stronger in the shoulder, has a larger eye, and yet more sunk in the head; his beak is stronger, his legs longer, and the toes better divided.

Next in size to these is the lanner, a bird now very little known in Europe; then follows the sacre, the legs of which are of a bluish colour, and serve to distinguish that bird; to them succeeds the hobby, used for smaller game, for daring larks, and stooping at quails. The kestrel was trained for the same purposes; and lastly the merlin; which though the smallest of all the hawk or falcon kind, and not much larger than a thrush, yet displays a degree of courage that renders him formidable even to birds ten times his size. He has often been known to kill a partridge or a quail at a single pounce from above.*

Some of the other species of sluggish birds were now and then trained to this sport, but it was when no better could be obtained; but these just described were only considered as birds of the nobler races. Their courage in general was such, that no bird, not very much above their own size, could terrify them; their swiftness so great, that scarce any bird could escape them; and their docility so remarkable, that they obeyed not only the commands, but the signs of their master. They remained quietly perched upon his hand till their game was flushed, or else kept hovering round his head, without ever leaving him but when he gave permission. The common falcon is a bird of such spirit, that, like a conqueror in a country, he keeps all birds in awe and in subjection to his prowess. Where he is seen flying wild, as I often had an opportunity of observing, the birds of every kind, that seemed entirely to disregard the kite or the sparrow-hawk, fly with screams at his most distant appearance. Long before I could see the falcon, I have seen them with the utmost signs of terror endeavouring to avoid him; and like the peasants of a country before a victorious army, every one of them attempting to shift for himself. Even the young falcons, though their spirit be depressed by captivity, will, when brought out into the field, venture to fly at barnacles and wild geese, till being soundly brushed and beaten by those strong birds, they learn their error, and desist from meddling with such unwieldy game for the future.

To train up the hawk to this kind of obedience, so as to hunt for his master, and bring him the game he shall kill, requires no small degree of skill and assiduity. Numberless treatises have been written upon this subject, which are

* UNDESCRIBED BIRD OF THE FAMILY FALCONIDÆ.—During the last two years, five specimens of a minute hawk, no account of which, there is reason to believe, has yet been published, have been brought to Manchester, at different periods, from Brazil. On inspecting this new species, it is evident, from several peculiarities in its organization, that it should occupy a situation, in a natural arrangement of birds, intermediate between the hawks and true falcons, as it unites in itself certain features characteristic of each of those groups. Its short bill, curved from the base, the upper mandible of which is furnished on each side with a small festoon; the shortness of its wings, notwithstanding the second quill-feather is the longest, and the first has the inner web slightly emarginated near its termination; the moderate length of the tail and legs; the reticulated tarsi, and the acrotarsia feathered from the knee to the middle, plainly indicate that it must be referred to the genus *Gampsonyx*, established by Mr. Vigors.—PHILOSOPHICAL MAGAZINE.

now, with the sport itself, almost utterly forgotten: indeed, except to a few, they seem utterly unintelligible; for the falconers had a language peculiar to themselves, in which they conversed and wrote, and took a kind of professional pride in using no other. A modern reader, I suppose, would be little edified by one of the instructions, for instance, which we find in Willughby, when he bids us *draw our falcon out of the mew twenty days before we enseam her. If she truss and carry, the remedy is, to cosse her talons, her powse, and petty single.**

Such are the natural and acquired habits of these birds, which of all others have the greatest strength and courage relative to their size. While the kite or the goshawk approach their prey sideways, these dart perpendicularly, in their wild state, upon their game, and devour it on the spot, or carry it off, if not too large for their power of flying. They are sometimes seen descending perpendicularly from the clouds, from an amazing height, and darting down on their prey with inevitable swiftness and destruction.

The more ignoble race of birds make up by cunning and assiduity what these claim by force and celerity. Being less courageous, they are more patient; and, having less swiftness, they are better skilled at taking their prey by surprise. The kite, that may be distinguished from all the rest of this tribe by his forky tail, and his slow, floating motion, seems almost for ever upon the wing. He appears to rest himself upon the bosom of the air, and not to make the smallest effort in flying. He lives only upon accidental carnage, as almost every bird in the air is able to make good his retreat against him. He may be, therefore, considered as an insiduous thief who only prowls about, and, when he finds a small bird wounded, or a young chicken strayed too far from the mother, instantly seizes the hour of calamity, and, like a famished glutton, is sure to show no

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(Hawking.)

* Manner of Hawking in England; Decline.—The practice of hawking declined from the moment the musket was brought to perfection, which pointed out a method more ready and more certain of procuring game; and, at the same time, afforded an equal degree of air and exercise. The immense expense of training and maintaining of hawks became altogether unnecessary; it was, therefore, no wonder that the assistance of the gun superseded that of the bird; or that the art of hawking, when rendered useless, should be laid aside. Hawking was performed on horseback, or on foot, as occasion required. On horseback, when in the fields and open country; and on foot, when in the woods and coverts. In following the hawk on foot, it was usual for the sportsman to have a stout pole with him, to assist him in leaping over little rivulets and ditches which might otherwise prevent him in his progress; and this we learn from an historical fact related by Hall, who informs us, that Henry the Eighth, pursuing his hawk on foot, at Hitchin in Hertfordshire, attempted with the assistance of his pole to jump over a ditch that was half full of muddy water; the pole broke and the king fell with his head into the mud, where he would have been stifled, had not a footman, named John Moody, who was near at hand, and seeing the accident, leaped into the ditch, and released his Majesty from his perilous situation; "And so," says the honest historian, "God of hys goodnesse preserved him."—Strutt's Sports and Pastimes.

Ancient Importance of Hawking.—No man of consequence formerly travelled abroad without his hawk and his hounds. In the early pictorial delineations, the nobility are frequently represented seated at table, with their hawks upon their heads. Chaucer says, speaking of the rich array and furniture of the palace of Theseus, (forgetting that he was a Grecian prince of great antiquity,)

"Ne what hawkes sytten on perchen above,
Ne what houndes lyggen on the floor adoun;"

which illustrates, in this particular, the large halls belonging to an English nobleman.

mercy. His hunger, indeed, often urges him to acts of seeming desperation. I have seen one of them fly round and round for awhile to mark a clutch of chickens, and then on a sudden dart like lightning upon the unresisting little animal, and carry it off, the hen in vain crying out, and the boys hooting and casting stones to scare it from its plunder. For this reason, of all birds the kite is the good housewife's greatest tormentor and aversion.*

Of all obscene birds, the kite is the best known; but the buzzard among us is the most plenty. He is a sluggish, inactive bird, and often remains perched whole days together upon the same bough. He is rather an assassin than a pursuer; and lives more upon frogs, mice, and insects, which he can easily seize, than upon birds which he is obliged to follow. He lives in summer by robbing the nests of other birds, and sucking their eggs, and more resembles the owl kind in his countenance than any other rapacious bird of day. His figure implies the stupidity of his disposition; and so little is he capable of instruction from man, that it is common to a proverb to call one who cannot be taught, or continues obstinately ignorant, a buzzard. The honey-buzzard, the moor-buzzard, and the hen-harrier, are all of this stupid tribe, and differ chiefly in their size, growing less in the order I have named. The goshawk and sparrow-hawk are what Mr. Willughby calls short-winged birds, and consequently unfit for training, however injurious they may be to the pigeon-house or the sportsman. They have been, indeed, taught to fly at game; but little is to be obtained from their efforts, being difficult of instruction and capricious in their obedience. It has been lately asserted, however, by one whose authority is respectable, that the sparrow-hawk is the boldest and the best of all others for the pleasure of the chase.†

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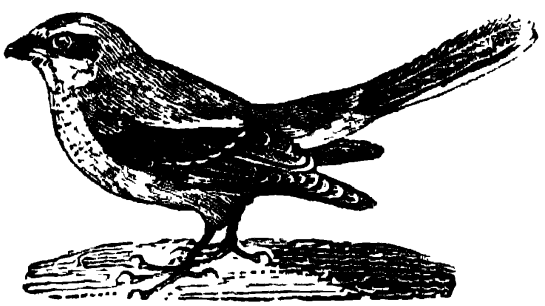
* **Voracity.**—A correspondent in a sporting Journal narrates the following:—" I went last summer to spend a month, and to wash away the fogs of London in the " salt sea ocean," at the little watering-place of Mudiford, near Christchurch, in Hampshire. During my stay, I frequently amused myself by boat excursions; and one sailor, in particular —a worthy, well-behaved son of the wave— was my Palinurus. We were sailing up the river on a fine bright morning—the waters glittered in the sunshine, and the finny tribe were basking on the face of them, when I observed a large, brown, speckled hawk, which I discovered to be what they term a *Dun-spittle hawk*, hovering or beating about above us. My shipmate instantly said, ' Ah ! what, there you are again, old pirate, at your old tricks: wait a bit, and you shall see him carry off his breakfast from the waters.'— ' Why,' I replied, ' I never knew hawks took fish;' but at that moment the bird gave a practical denial to my opinion, by suddenly making a sweep downwards, and bearing off in his grasp a mullet of good size, and with which he flew to the common bounding the river. This manœuvre, I understood, he repeated every day. I was not aware before that the enemy of partridges feasted upon fish."

† **The Sparrow-hawk.**—This destructive bird is remarkable for the great difference in size between the male and female, the former seldom measuring twelve inches in length, whilst the latter often exceeds fifteen. It is one of the boldest of its genus; and the female, from her superior size, is a fatal enemy to partridges and other game. It flies low, skimming over the ground with great swiftness, and pounces its prey upon the wing with unerring aim. The force of its stroke is such as generally to kill, and sometimes even to force out the entrails of its victim. It is common in most parts of the kingdom, but particularly frequents the lower grounds and well-wooded inclosures: it builds in low trees, or thorn bushes, forming a shallow and flat nest, composed of slender twigs, and very similar to that of the ring-dove, but rather larger. It will occasionally occupy the deserted nest of a crow.

(The Sparrow-hawk.)

CHAP. XIII.

THE BUTCHER BIRD.



(The Butcher-Bird.)

Before I conclude this short history of rapacious birds that prey by day, I must take leave to describe a tribe of smaller birds, that seem from their size rather to be classed with the harmless order of the sparrow kind; but that from their crooked beak, courage, and appetites for slaughter, certainly deserve a place here. The lesser **Butcher Bird** is not much above the size of a lark—that of the smallest species is not so big as a sparrow; yet, diminutive as these little animals are, they make themselves formidable to birds of four times their dimensions.*

The greater butcher bird is about as large as a thrush; its bill is black, an inch long, and hooked at the end. This mark, together with its carnivorous appetites, ranks it among the rapacious birds; at the same time that its legs and feet, which are slender, and its toes formed somewhat differently from the former, would seem to make it the shade between such birds as live wholly upon flesh, and such as live chiefly upon insects and grain.

Indeed, its habits seem entirely to correspond with its conformation, as it is found to live as well upon flesh as upon insects, and thus to partake in some measure of a double nature. However, its appetite for flesh is the most prevalent; and it never takes up with the former when it can obtain the latter This bird, therefore, leads a life of continual combat and opposition. As from its size it does not much terrify the smaller birds of the forest, so it very frequently meets birds willing to try its strength, and it never declines the engagement.

It is wonderful to see with what intrepidity this little creature goes to war with the pie, the crow, and the kestrel, all above four times bigger than itself, and that sometimes prey upon flesh in the same manner. It not only fights upon the defensive, but often comes to the attack, and always with advantage, particularly when the male and female unite to protect their young, and to drive away the more powerful birds of rapine. At that season, they do not wait the approach of their invader; it is sufficient that they see him preparing for the assault at a distance. It is then that they sally forth with loud cries, wound him on every side, and drive him off with such fury, that he seldom ventures to return to the charge. In these kinds of disputes, they generally come off with the victory; though it sometimes happens that they fall to the ground with the bird they have so fiercely fixed upon, and the combat ends with the destruction of the assailant as well as the defender.

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* **Shrikes.**—The tribe of birds here noticed under the name of Butcher birds are otherwise called *Shrikes*. Shrikes are spread over the entire globe, and everywhere exhibit similar dispositions, habits, and modes of existence. Of small size, but armed with a strong and crooked beak, of a fierce, courageous disposition, and of a sanguinary appetite, they bear much affinity to the birds of prey. Naturally intrepid, they defend themselves vigorously, and do not hesitate to attack birds much stronger and larger than themselves. The European shrikes can combat, with advantage, pies, crows, and even kestrels. They attack and pursue these birds with great ferocity, if they dare to approach their nests. It is even sufficient if any of them should pass within reach. They are habitually insectivorous, and also pursue small birds. When they have seized a bird, they open the cranium, devour the brain, deplume the body, and tear it piecemeal. Though we have observed that the shrike genus is extended over the entire globe, we believe South America must be excepted. The South American birds, which have been called shrikes, belong to other divisions, and it would appear that this genus does not pass beyond the Floridas, Louisiana, and the north of Mexico.

For this reason, the most redoubtable birds of prey respect them; while the kite, the buzzard, and the crow, seem rather to fear than seek the engagement. Nothing in nature better displays the respect paid to the claims of courage than to see this little bird, apparently so contemptible, fly in company with the lanner, the falcon, and all the tyrants of the air, without fearing their power, or avoiding their resentment.*

As for small birds, they are its usual food. It seizes them by the throat, and strangles them in an instant. When it has thus killed the bird or insect, it is asserted, by the best authority, that it fixes them upon some neighbouring thorn, and, when thus spitted, pulls them to pieces with its bill. It is supposed that as Nature has not given this bird strength sufficient to tear its prey to pieces with its feet, as the hawks do, it is obliged to have recourse to this extraordinary expedient.

During summer, such of them as constantly reside here, for the smaller red butcher bird migrates, remain among the mountainous parts of the country; but in winter they descend into the plains and nearer human habitations. The larger kind make their nests on the highest trees, while the lesser build in bushes in the fields and hedge-rows. They both lay about six eggs, of a white colour, but encircled at the bigger end with a ring of brownish red. The nest on the outside is composed of white moss, interwoven with long grass; within, it is well lined with wool, and is usually fixed among the forking branches of a tree. The female feeds her young with caterpillars, and other insects, while very young; but soon after accustoms them to flesh, which the male procures with surprising industry.

Of these birds there are three or four different kinds; but the greater ash-coloured butcher bird is the least known among us. The red-backed butcher bird migrates in autumn, and does not return till spring.†

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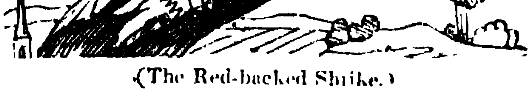
* **Education.**—Falconers have taken advantage of the character of these birds, and occasionally trained them for the chase. Francis the First, according to Turner's account, was accustomed to hunt with a tame shrike, which used to speak, and return upon the hand. The Swedish hunters, availing themselves of the habit of the grey shrike of uttering a peculiar sort of cry at the approach of a hawk, make use of it to discover the birds of prey which this kind of cry announces. Bell, in his Travels from Moscow, through Siberia, to Pekin, says, that in Russia these birds are often taken by bird-catchers and made tame. He had one of them given to him, which he taught to perch on a sharpened stick fixed in the wall of his apartment. Whenever a small bird was let loose in the room, the butcher bird would immediately fly from his perch, and seize it by the throat in such a manner as to suffocate it in a moment almost. He would then carry it to his perch, and spit it on the end, which was sharpened for the purpose, drawing it on carefully and forcibly with his bill and claws. If several birds were given him, he would use them all, one after another, in the same manner. These were so fixed that they hung by the neck till he had leisure to devour them. This singular practice has given rise to the appellation of butcher bird.

† The **Red-backed Shrike**, or Lesser Butcher bird, is about seven inches long. Its bill is black; the head and lower part of the back, and coverts of the wings, are of a bright rusty red; the breast, belly, and sides, are of a fine, pale rose, or bloom colour; the throat is white; a stroke of black passes from the bill through each eye; the two middle feathers of the tail are black, as also are the legs.

It inhabits Great Britain and various other temperate countries of Europe; it feeds on young birds, beetles, and grasshoppers.

Habits.—The Great Butcher bird of America is said to stick grasshoppers upon sharp thorns, for the purpose, as is supposed, of tempting the smaller birds into a situation where it can easily dart out upon and seize them.



(The Red-backed Shrike.)

CHAP. XIV.

OF RAPACIOUS BIRDS OF THE OWL KIND THAT PREY BY NIGHT.

HITHERTO we have been describing a tribe of animals who, though plunderers among their fellows of the air, yet wage war boldly in the face of day. We now come to a race equally cruel and rapacious; but who add to their savage disposition the further reproach of treachery, and carry on all their depredations by night.*

(The Eagle-Owl.)

All birds of the OWL kind may be considered as nocturnal robbers, who, unfitted for taking their prey while it is light, surprise it at those hours of rest when the tribes of nature are in the least expectation of an enemy. Thus there seems no link in nature's chain broken; no where a dead, inactive repose; but every place, every season, every hour of the day and night, is bustling with life, and furnishing instances of industry, self-defence, and invasion.

All birds of the owl kind have one common mark by which they are distinguished from others; their eyes are formed for seeing better in the dusk than in the broad glare of sunshine. As in the eyes of tigers and cats, that are formed for a life of nocturnal depredation, there is a quality in the retina that takes in the rays of light so copiously as to permit their seeing in places almost quite dark; so in these birds there is the same conformation of that organ, and though, like us, they cannot see in a total exclusion of light, yet they are sufficiently quick-sighted at times when we remain in total obscurity.

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* NOCTURNAL BIRDS OF PREY.—The endless aberrations of nature from given types—the unwillingness she seems to exhibit to be shackled by general universal rules—the excursive propensities, as it were, of her creative powers, which defy the faculty of the zoological systematist—are equally observable, whether we regard her works in the mass or examine them in detail, whether we contemplate a class, a genus, or a subordinate group. Thus, although we find that the light and heat of the sun are agents of a most influential character in the developement of life in both the animal and vegetable kingdoms; although the rule is most extensively prevalent that the day shall be the period for activity, and the night for resuscitation and repose, yet this rule is by no means universal. A few beings are destined to an active existence only, while all other creatures sleep; and among these, in the present class, stand foremost the nocturnal birds of prey. The nocturnal habits of these birds are decidedly predestinated by their physical characters. The owl is not made for the full light of day, and can live only, for all the active purposes of life, in partial darkness: the dusk of evening, or grey of the morning, is essential to the full exercise of her vision; the noonday sun, or even the presence of that luminary anywhere above the horizon, dazzles and blinds her by the influx of too much light, consequent on the unusual largeness of the disk eye-pupil; but this very circumstance, which is a source of so much inconvenience to the animal by day, is, in fact, an admirable contrivance for the perfection of vision during the comparative darkness of twilight or night. When the rays of light are diffused, and cannot find access in sufficient quantity to the ordinary pupils of diurnal animals, the capaciousness of those of the owl takes in enough for the perfect use of the eye; the shape of the pupil seems to be unimportant, but the capaciousness of the disk is certainly essential to nocturnal vision.

The nights when the moon shines are the times of their most successful plunder; for when it is wholly dark, they are less qualified for seeing and pursuing their prey. Except, therefore, by moonlight, they contract the hours of their chase; and if they come out at the approach of dusk in the evening, they return before it is totally dark, and then rise by twilight the next morning, to pursue their game, and to return, in like manner, before the broad daylight begins to dazzle them with its splendour.

Yet the faculty of seeing in the night, or of being entirely dazzled by day, is not alike in every species of these nocturnal birds: some see by night better than others, and some are so little dazzled by daylight that they perceive their enemies and avoid them. The common White or Barn Owl, for instance, sees with such exquisite acuteness in the dark, that though the barn has been shut at night, and the light thus totally excluded, yet it perceives the smallest mouse that peeps from its hole; on the contrary, the Brown Horn Owl is often seen to prowl along the hedges by day, like the sparrow-hawk, and sometimes with good success.

All birds of the owl kind may be divided into two sorts; those that have horns, and those without. These horns are nothing more than two or three feathers that stand up on each side of the head over the ear, and give this animal a kind of horned appearance. Of the horned kind is the Great Horned Owl, which at first view appears as large as an eagle. When he comes to be observed more closely, however, he will be found much less. His legs, body, wings, and tail, are shorter; his head much larger and thicker: his horns are composed of feathers that rise above two inches and a half high, and which he can erect or depress at pleasure: his eyes are large and transparent, encircled with an orange-coloured iris: his ears are large and deep, and it would appear that no animal was possessed with a more exquisite sense of hearing: his plumage is of a reddish brown, marked on the back with black and yellow spots, and yellow only upon the belly.*

Next to this is the Common Horned Owl, of a much smaller size than the former, and with horns much shorter. As the great owl was five feet from the tip of one wing to the other, this is but three. The horns are but about an inch long, and consist of six feathers, variegated with black and yellow.

There is still a smaller kind of the horned owl, which is not much larger than a blackbird; and whose horns are remarkably short, being composed but of one feather, and that not above half an inch high.

To these succeeds the tribe without horns. The Howlet, which is the largest of this kind, with dusky plumes and black eyes; the Screech Owl, of a smaller size, with blue eyes, and plumage of an iron grey; the White Owl, about as large as the former, with yellow eyes and whitish plumage; the Great Brown Owl, less than the former, with brown plumage and a brown beak; and, lastly, the Little Brown Owl, with yellowish-coloured eyes, and an orange coloured bill. To this catalogue might be added others of foreign denominations, which differ but little from our own, if we except the Harfang, or Great Hudson's Bay Owl of Edwards, which is the largest of all the nocturnal tribe, and as white as the snows of the country of which he is a native.*

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* Great Horned Owl.—Mr. Lloyd, in Field Sports of the North of Europe, speaking of the Great Horned Owl, which abounds in the Scandinavian forests, says that he suspects this bird to be a destroyer of the foxes of that country. These owls, he was assured, will sometimes destroy dogs. He himself knew an instance of the kind. A circumstance is stated showing the ferocity of these birds. Two men were in the forest for the purpose of gathering berries, when one of them happening to approach near to the nest of the owl, she pounced upon him whilst in the act of stooping, and fixing her talons in his back, wounded him very severely. His companion was fortunately at hand with a stick, and the ferocious bird was destroyed. Mr. Nilsson states that these owls not unfrequently engage in combat with the eagle himself, and that they often come off victorious The largest of the birds common to the Scandinavian forests, such as the capercali, often become their prey.

All this tribe of animals, however they may differ in their size and plumage, agree in their general characteristics of preying by night, and having their eyes formed for nocturnal vision. Their bodies are strong and muscular; their feet and claws made for tearing their prey, and their stomachs for digesting it. It must be remarked, however, that the digestion of all birds that live upon mice, lizards, or such like food, is not very perfect; for though they swallow them whole, yet they are always seen some time after to disgorge the skin and bones, rolled up in a pellet, as being indigestible.†

Having spent the day in their retreat, these birds, at the approach of evening,

(The Coquimbo Owl.)

* THE BISCACHO, OR COQUIMBO OWL.— This bird, Capt. Head observes, is found all over the plains of the Pampas. Like rabbits, they live in holes, which are in groups in every direction, and which make galloping over these plains very dangerous. These animals are never seen in the day; but, as soon as the lower limb of the sun reaches the horizon, they are seen issuing from their holes in all directions, which are scattered in groups like little villages all over the Pampas. The biscachos, when full grown, are nearly as big as badgers, but their head resembles a rabbit's, except that they have large bushy whiskers. In the evening they sit outside their holes, and they all appear to be moralizing. They are the most serious-looking animals I ever saw: and even the young ones are grey-headed, have mustachios, and look thoughtful and grave. In the daytime their holes are guarded by two little owls, who are never an instant away from their posts. As one gallops by these owls they always stand looking at the stranger, and then at each other, moving their old-fashioned heads in a manner which is quite ridiculous, until one rushes by them, when fear gets the better of their dignified looks, and they both run into the biscacho's hole.—ARCANA OF SCIENCE, 1829.

THE OWL GENUS.—In conclusion of these brief observations on a few select species of this genus, we have to regret that in no branch of zoology does there appear to be more confusion and uncertainty than in this very limited but well-defined group of nocturnal birds of prey. The owls are very distinct from the diurnal rapacious birds. The former have obtuse sight, while the latter enjoy that sense to an exquisite degree of perfection. The owls have feathers at the base of the bill, with the upper mandible in some degree movable, as in the parrots; one of their anterior toes, also, is capable of being turned behind, and their flight is in general heavy and silent; while the diurnal accipitres, in general, have a denuded fleshy ridge at the base of the bill, with the upper mandible perfectly fixed, all the toes fixed, and a rápid, elevated, noisy flight.

† FOOD.—It is observable, from the quantity of animal and vegetable food, that animals which feed on the former are capable of enduring abstinence much longer than those which subsist on the latter. If, therefore, this fact be considered in conjunction with the conditions of these birds just alluded to, we may fairly conclude that if owls had been vegetable eaters, they would soon have all starved; for, without some special provision against such a consequence, the short spaces of time they could appropriate to procuring food would be insufficient to enable them to collect vegetable matter in sufficient quantity; but the owl, which is necessarily abstinent, is carnivorous: so congruous are the works of nature! The owl is enabled to make the most of the short time allowed for its predatory excursions, by the exposed situation of its prey, and by some other conditions of its own, which may deserve notice. Most of the small birds and quadrupeds pursued by the owl are the less able to guard themselves by flight or concealment from the adversary by the partial darkness, which, while it is advantageous to the owl, deprives them of the full advantages of sight. The quill feathers, moreover, of the owl, so light and downy that it makes very little noise in flight, and gives, therefore, but little warning to its prey through the sense of hearing.

sally forth and skim rapidly up and down along the hedges. The barn-owl, indeed, who lives chiefly upon mice, is contented to be more stationary: he takes his residence upon some shock of corn, or the point of some old house, and there watches in the dark, with the utmost perspicacity and perseverance.

Nor are these birds by any means silent; they all have a hideous note; which, while pursuing their prey, is seldom heard, but may be considered rather as a call to courtship. There is something always terrifying in this call, which is often heard in the silence of midnight, and breaks the general pause with a horrid variation. It is different in all; but in each it is alarming and disagreeable. Father Kircher, who has set the voices of birds to music, has given all the tones of the owl note, which makes a most tremendous melody. Indeed, the prejudices of mankind are united with their sensations to make the cry of the owl disagreeable. The screech-owl's voice was always considered among the people, as a presage of some sad calamity that was soon to ensue.*

They seldom, however, are heard while they are preying: that important pursuit is always attended with silence, as it is by no means their intention to disturb, or forewarn these little animals they wish to surprise. When their pursuit has been successful, they soon return to their solitude, or to their young, if that be the season. If, however, they find but little game, they continue their quest still longer; and it sometimes happens that, obeying the dictates of appetite rather than of prudence, they pursue so long that broad day breaks in upon them, and leaves them dazzled, bewildered, and at a distance from home.

In this distress they are obliged to take shelter in the first tree or hedge that offers, there to continue concealed all day, till the returning darkness once more supplies them with a better plan of the country. But it too often happens that, with all their precaution to conceal themselves, they are spied out by the other birds of the place, and are sure to receive no mercy. The blackbird, the thrush, the jay, the bunting, and the redbreast, all come in file, and employ their little arts of insult and abuse. The smallest, the feeblest, and the most contemptible of this unfortunate bird's enemies are then the foremost to injure and torment him. They increase their cries and turbulence round him, flap him with their wings, and are ready to show their courage to be great, as they are sensible that their danger is but small. The unfortunate owl, not knowing where to attack or where to fly, patiently sits and suffers all their insults. Astonished and dizzy, he only replies to their mockeries by awkward and ridiculous gestures, by turning his head and rolling his eyes with an air of stupidity. It is enough that an owl appears by day to set the whole grove into a kind of uproar. Either the aversion all the small birds have to this animal, or the consciousness of their own security, makes them pursue him without ceasing, while they encourage each other by their mutual cries to lend assistance in this laudable undertaking.*

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* HOOT OF THE OWL.—Dr Richardson, in speaking of the great Virginian horned owl, gives the following animated picture of its dismal unearthly cry. He says, "It is found in almost every quarter of the United States, and occurs in all parts of the fur countries. Its loud and full nocturnal cry, issuing from the gloomy recesses of the forest, bear some resemblance to the human voice, uttered in a hollow, sepulchral tone, and has been frequently productive of alarm to the traveller, of which an instance occurred within my own knowledge. A party of Scottish Highlanders, in the service of the Hudson's Bay Company, happened, in a winter journey, to encamp after nightfall in a dense clump of trees, whose dark tops and lofty stems, the growth of centuries, gave a solemnity to the scene that had strongly tended to excite the superstitious feelings of the Highlanders. The effect was heightened by the discovery of a tomb, which, with a natural taste often exhibited by the Indians, had been placed in this secluded spot. Our travellers, having finished their supper, were trimming their fire, preparatory to retiring to rest, when the slow and dismal notes of the horned owl fell on the ear with a startling nearness. None of them being acquainted with the sound, they at once concluded that so unearthly a voice must be the moaning of the spirit of the departed, whose repose they supposed they had disturbed, by inadvertently making a fire of the wood of which the tomb had been constructed. They passed a tedious night of fear, and with the first dawn of day hastily quitted the ill-omened spot." Audubon describes the cry of this owl as fearful. He says, "It suddenly alights on the top of a fern stake or a dead stump, shakes its feathers, arranges them, and utters a shriek so horrid that the woods around echo to its dismal sound. Now, it seems as if you heard the barking of a cur-dog; again, the notes are so rough and mingled together, that they might be mistaken for the last gurglings of a murdered person, striving in vain to call for assistance."—HISTORY OF SELBORNE.—*Note.*

To conclude our account of these birds, they are all very shy of man, and extremely indocile and difficult to be tamed. The white owl, in particular, as Buffon asserts, cannot be made to live in captivity; I suppose he means if it be taken when old. "They live," says he, "ten or twelve days in the aviary where they are shut up; but they refuse all kind of nourishment, and at last die of hunger. By day they remain without moving upon the floor of the aviary; in the evening, they mount on the highest perch, where they continue to make a noise like a man snoring with his mouth open. This seems designed as a call for their old companions without; and, in fact, I have seen several others come to the call, and perch upon the roof of the aviary, where they made the same kind of hissing, and soon after permitted themselves to be taken in a net.†

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* The White-horned Owl.—This very beautiful owl appears to be rare, only one specimen having been seen by the members of the overland expedition to the Polar Sea, under Sir John Franklin. It was observed flying at mid-day in the immediate vicinity of Carlton House, and was brought down with an arrow by an Indian boy. Dr Richardson could obtain no information respecting its habits.

From Mr. Swainson's minute description we learn that the colour of the bill and claws is bluish black. The face is white, and a band of blackish-brown and white crosses the throat. The egrets or ear feathers are tipped with blackish-brown, the inner webs being white varied with wood-brown. The whole of the back is marked with undulated lines or fine bars of dark umber brown, alternating with white; on the greater wing coverts the white is replaced by pale wood-brown. The primary and secondary feathers are wood brown, margined inwards with white. They are crossed by umber brown bars on both webs, the intervening spaces being finely speckled with the same. On the tertiary feathers the wood brown is mostly replaced by white. The tail feathers are white, deeply tinged inwards by wood-brown, and crossed by bars of umber brown; the tips are white. The chin is white. The throat is crossed by the band already mentioned, behind which there is a large space of pure snow white, that is bounded on the breast by blotches of liver-brown situated on the tips of the feathers. The belly and long plumage of the flanks are white, crossed by narrow bars of dark brown. The under tail coverts, thighs, and feet are pure white. The linings of the wings are pure white, with the exception of a brown spot on the tips of the great interior coverts. The bill is strong, curved from the base, moderately compressed towards the tip, with a very obtuse ridge. The facial disk is small, and incomplete above the orbit. The egrets are more than two inches long, each composed of six or seven feathers, and situate behind the upper end of the black band bounding the face. The folded wings fall about three inches and a half short of the tail, which is rounded, the outer feathers being an inch shorter than the central ones. The plumage of the sides of the belly is long, and hangs down over the thighs. The thigh feathers are very downy, but are not long. The tarsi are rather long, and the toes are moderately long; they are clothed to the roots of the nails by a close coat of hairy feathers. The claws are strong, sharp, and very much curved.

The length of the bird from the tip of the bill to the end of the tail is 21 inches 6 lines; and the length of the longest quill feather is 12 inches six lines.—Mirror, vol. xix.

† Attachment.—Constedt, in the Transactions of the Philosophical Society of Stockholm, has recorded a pleasing instance of their attachment to their young. A young owl having quitted the nest in the month of July, was caught by his servant, and shut up in a large hen coop. The next morning a young partridge was found lying dead before the door of the coop. For fourteen successive nights the same circumstance was repeated, plainly proving that it had been brought there by the old birds as a provision for the young one. Till the month of August, various articles of food, as young partridges, moor-fowl, pieces of lamb, and other substances, were regularly brought; after which time the parents discontinued their attendance; and it may be remarked that this is the period when all birds of prey abandon their young to their own exertions.

The Barn Owl.—This pretty aërial wanderer of the night often comes into my room; and after flitting to and fro, on wing so soft and silent that he is scarcely heard, he takes his departure from the same window at which he had entered.

I own I have a great liking for this bird; and I have offered it hospitality and protection on account of its persecutions, and for its many services to me—I say services, as you will see in the sequel. I wish that any little thing I could write or say might cause it to stand better with the world at large than it has hitherto done: but I have slender hopes on this score; because old and deep-rooted prejudices are seldom overcome; and when I look back into the annals of remote antiquity, I see too clearly that defamation has done its worst to ruin the whole family, in all its branches, of this poor, harmless, useful friend of mine.

(The Barn Owl.)

Ovid, nearly two thousand years ago, was extremely severe against the owl. In his *Metamorphoses* he says:—

> " Fœdaque fit volucris, venturi nuncia luctus,
> Ignavus bubo, dirum mortalibus omen."

In his *Fasti* he openly accuses it of felony:—

> " Nocte volant, puerosque petunt nutricis egentes."

Lucan, too, has hit it hard:—

> " Et lætæ juranter aves, bubone sinistro;"

and the Englishman, who continued the *Pharsalia*, says—

> " Tristia mille locis Stygius dedit omina bubo."

Horace tells us that the old witch Canidia used part of the plumage of the owl in her dealings with the devil:—

> " Plumamque nocturnæ strigis."

Virgil, in fine, joined in the hue and cry against this injured family:—

> " Solaque culminibus ferali carmine bubo
> Sæpe queri, et longas in fletum ducere voces."

In our own times we find that the village maid cannot return home from seeing her dying swain, without a doleful salutation from the owl:—

> " Thus homeward as she hopeless went,
> The churchyard path along,
> The blast grew cold, the dark owl scream'd
> Her lover's funeral song."

Amongst the numberless verses which might be quoted against the family of the owl, I think I only know of one little ode which expresses any pity for it. Our nursery maid used to sing it to the tune of the Storm, "Cease rude Boreas, blust'ring railer." I remember the first two stanzas of it:—

> " Once I was a monarch's daughter,
> And sat on a lady's knee;
> But am now a nightly rover,
> Banish'd to the ivy tree—
> Crying hoo hoo, hoo hoo, hoo hoo,
> Hoo hoo hoo, my feet are cold!
> Pity me, for here you see me,
> Persecuted, poor, and old.

I beg the reader's pardon for this exordium. I have introduced it, in order to show how little chance there has been, from days long passed and gone to the present time, of studying the haunts and economy of the owl, because its unmerited bad name has created it a host of foes, and doomed it to destruction from all quarters. Some few, certainly, from time to time, have been kept in cages and in aviaries. But nature rarely thrives in captivity, and very seldom appears in her true character when she is encumbered with chains, or is to be looked at by the passing crowd through bars of iron. However, the scene is now going to change; and I trust that the reader will contemplate the owl with more friendly feelings, and quite under different circumstances. Here no rude schoolboy ever approaches its retreat; and those who once dreaded its diabolical doings are now fully satisfied that it no longer meddles with their destinies, or has anything to do with the repose of their departed friends. Indeed, human wretches in the shape of body-snatchers seem here in England to have usurped the office of the owl in our churchyards; "et vendunt tumulis corpora rapta suis."

Up to the year 1813, the barn owl had a sad time of it at Walton Hall. Its supposed mournful notes alarmed the aged housekeeper. She knew full well what sorrow it had brought into other houses when she was a young woman; and there was enough of mischief in the midnight wintry blast, without having it increased by the dismal screams of something which people knew very little about, and which everybody said was far too busy in the churchyard at night-time. Nay, it was a well-known fact that, if any person were sick in the neighbourhood, it would be for ever looking in at the window, and holding a conversation outside with somebody, they did not know whom. The gamekeeper agreed with her in everything she said on this important subject; and he always stood better in her books when he had managed to shoot a bird of this bad and mischievous family. However, in 1813, on my return from the wilds of Guiana, having suffered myself, and learned mercy, I broke in pieces the code of penal laws which the knavery of the gamekeeper and the lamentable ignorance of the other servants had hitherto put in force, far too successfully, to thin the numbers of this poor, harmless, unsuspecting tribe. On the ruin of the old gateway, against which tradition says the waves of the lake have dashed for the better part of a thousand years, I made a place with stone and mortar, about four feet square, and fixed a thick oaken stick firmly into it. Huge masses of ivy now quite cover it. In about a month or so after it was finished, a pair of barn owls came and took up their abode in it. I threatened to strangle the keeper if ever after this he molested either the old birds or their young ones; and I assured the housekeeper that I would take upon myself the whole responsibility of all the sickness, woe, and sorrow that the new tenants might bring into the hall. She made a low courtesy; as much as to say, "Sir, I fall into your will and pleasure:" but I saw in her eye that she had made up her mind to have to do with things of fearful and portentous shape, and to hear many a midnight wailing in the surrounding woods. I do not think that up to the day of this old lady's death, which took place in her eighty-fourth year, she ever looked with pleasure or contentment on the barn owl, as it flew round the large sycamore trees which grow near the old ruined gateway.

When I found that this first settlement on the gateway had succeeded so well, I set about forming other establishments. This year I have had four broods, and I trust that next season I can calculate on having nine. This will be a pretty increase, and it will help to supply the place of those which in this neighbourhood are still unfortunately doomed to death by the hand of cruelty or superstition. We can now always have a peep at the owls, in their habitation on the old ruined gateway, whenever we choose. Confident of protection, these pretty birds betray no fear when the stranger mounts up to their place of abode. I would here venture a surmise, that the barn owl sleeps standing. Whenever we go to look at it, we invariably see it upon the perch bolt upright, and often with its eyes closed, apparently fast asleep. Buffon and Bewick err (no doubt unintentionally) when they say that the barn owl snores during its repose. What they took for snoring was the cry of the young birds for food. I had fully satisfied myself on this score some years ago. However, in December, 1823, I was much astonished to hear this same snoring kind of noise, which had been so common in the month of July. On ascending the ruin, I found a brood of young owls in the apartment.

Upon this ruin is placed a perch, about a foot from the hole at which the owls enter. Sometimes, at midday, when the weather is gloomy, you may see an owl upon it, apparently enjoying the refreshing diurnal breeze. This year (1831) a pair of barn owls hatched their young, on the 7th of September, in a sycamore tree near the old ruined gateway.

If this useful bird caught its food by day, instead of hunting for it by night, mankind would have ocular demonstration of its utility in thinning the country of mice, and it would be protected and encouraged everywhere. It would be with us what the ibis was with the Egyptians. When it has young, it will bring a mouse to the nest about every twelve or fifteen minutes. But, in order to have a proper idea of the enormous quantity of mice which this bird destroys, we must examine the pellets which it ejects from its stomach in the place of its retreat. Every pellet contains from four to seven skeletons of mice. In sixteen months from the time that the apartment of the owl on the old gateway was cleaned out, there has been a deposit of above a bushel of pellets.

The barn owl sometimes carries off rats. One evening I was sitting under a shed, and killed a very large rat as it was coming out of a hole, about ten yards from where I was watching it. I did not go to take it up, hoping to get another shot. As it lay there, a barn owl pounced upon it, and flew away with it.

This bird has been known to catch fish. Some years ago, on a fine evening in the month of July, long before it was dark, as I was standing on the middle of the bridge, and minuting the owl by my watch, as she brought mice into her nest, all on a sudden she dropped perpendicular into the water. Thinking that she had fallen down in epilepsy, my first thoughts were to go and fetch the boat; but before I had well got to the end of the bridge, I saw the owl rise out of the water with a fish in her claws, and take it to the nest. This fact is mentioned by the late much revered and lamented Mr. Atkinson of Leeds, in his Compendium, in a note, under the signature of W., a friend of his, to whom I had communicated it a few days after I had witnessed it.

I cannot make up my mind to pay any attention to the description of the amours of the owl by a modern writer; at least the barn owl plays off no buffooneries here, such as those which he describes. An owl is an owl all the world over, whether under the influence of Momus, Venus, or Diana.

When farmers complain that the barn owl destroys the eggs of their pigeons, they lay the saddle on the wrong horse. They ought to put it on the rat. Formerly I could get very few young pigeons till the rats were excluded effectually from the dovecot. Since that took place, it has produced a great abundance every year, though the barn owls frequent it, and are encouraged all around it. The barn owl merely resorts to it for repose and concealment. If it were really an enemy to the dovecot, we should see the pigeons in commotion as soon as it begins its evening flight; but the pigeons heed it not: whereas if the sparrow-hawk or windhover should make their appearance, the whole community would be up at once—proof sufficient that the barn owl is not looked upon as a bad, or even a suspicious, character by the inhabitants of the dovecot.

Till lately, a great and well-known distinction has always been made betwixt the screeching and the hooting of owls. The tawny owl is the only owl which hoots; and when I am in the woods after poachers, about an hour before daybreak, I hear with extreme delight its loud, clear, and sonorous notes, resounding far and near through hill and dale. Very different from these notes is the screech of the barn owl. But Sir William Jardine informs us that this owl hoots; and that he has shot it in the act of hooting. This is stiff authority; and I believe it because it comes from the pen of Sir William Jardine. Still, however, methinks that it ought to be taken in a somewhat diluted state; we know full well that most extraordinary examples of splendid talent do, from time to time, make their appearance on the world's wide stage. Thus, Franklin brought down fire from the skies:—"Eripuit fulmen cœlo, sceptrumque tyrannis." Paganini has led all London captive, by a piece of twisted catgut:—"Tu potes reges comitesque stultos ducere." Leibnitz tells us of a dog in Germany that could pronounce distinctly thirty words; Goldsmith informs us that he once heard a raven whistle the tune of the "Shamrock," with great distinctness, truth, and humour. With these splendid examples before our eyes, may we not be inclined to suppose that the barn owl which Sir William shot in the absolute act of hooting may have been a gifted bird, of superior parts and knowledge (*una de multis*, as Horace said of Miss Danaus), endowed, perhaps, from its early days with the faculty of hooting, or else skilled in the art by having been taught it by its neighbour, the tawny owl? I beg to remark that, though I unhesitatingly grant the faculty of hooting to this one particular individual owl, still I flatly refuse to believe that hooting is common to barn owls in general. Ovid, in his sixth book *Fastorum*, pointedly says that it screeched in his day:—

> "Est illis strigibus nomen: sed nominis hujus
> Causa, quod horrendâ stridere nocte solent."

The barn owl may be heard shrieking here perpetually on the portico, and in the large sycamore trees near the house. It shrieks equally when the moon shines and when the night is rough and cloudy; and he who takes an interest in it may here see the barn owl the night through when there is a moon; and he may hear it shriek when perching on the trees, or when it is on wing. He may see it and hear it shriek, within a few yards of him, long before dark; and again, often after daybreak, before it takes its final departure to its wonted resting-place. I am amply repaid for the pains I have taken to protect and encourage the barn owl; it pays me a hundredfold by the enormous quantity of mice which it destroys throughout the year. The servants now no longer wish to persecute it. Often, on a fine summer's evening, with delight I see the villagers loitering under the sycamore trees longer than they would otherwise do, to have a peep at the barn owl, as it leaves the ivy-mantled tower: fortunate for it, if, in lieu of exposing itself to danger, by mixing with the world at large, it only knew the advantage of passing its nights at home; for here

> "No birds that haunt my valley free
> To slaughter I condemn;
> Taught by the Power that pities me,
> I learn to pity them"

WATERTON—MAG. OF NAT. HIST

CHAP. I.

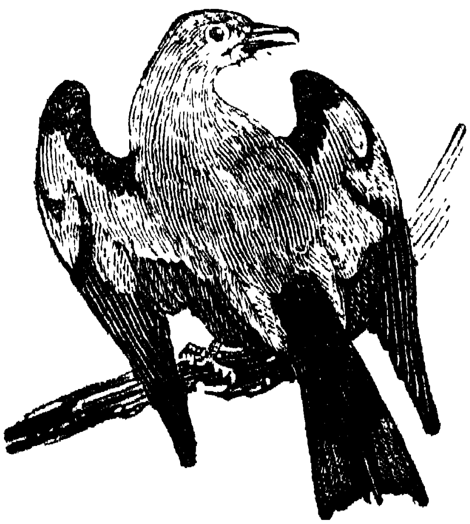
OF BIRDS OF THE POULTRY KIND.

From the most rapacious and noxious tribe of birds, we make a transition to those which of all others is the most harmless and the most serviceable to man. He may force the rapacious tribes to assist his pleasures in the field, or induce the smaller warblers to delight him with their singing; but it is from the poultry kind that he derives the most solid advantages, as they not only make a considerable addition to the necessaries of life, but furnish out the greatest delicacies to every entertainment.

Almost, if not all, the domestic birds of the poultry kind that we maintain in our yards are of foreign extraction; but there are others to be ranked in this class that are as yet in a state of nature, and perhaps only wait till they become sufficiently scarce to be taken under the care of man to multiply their propagation. It will appear remarkable enough, if we consider how much the tame poultry which we have imported from distant climates has increased, and how much those wild birds of the poultry kind that have never yet been taken into keeping have been diminished and destroyed. They are all thinned; and many of the species, especially in the more cultivated and populous parts of the kingdom, are utterly unseen.

As Nature has formed the rapacious classes for war, so she seems equally to have fitted these for peace, rest, and society. Accordingly we find them chiefly in society; they live together; and though they may have their disputes, like all other animals, upon some occasions, yet, when kept in the same district, or fed in the same yard, they learn the arts of subordination; and, in proportion as each knows his strength, he seldom tries a second time the combat where he has once been worsted.

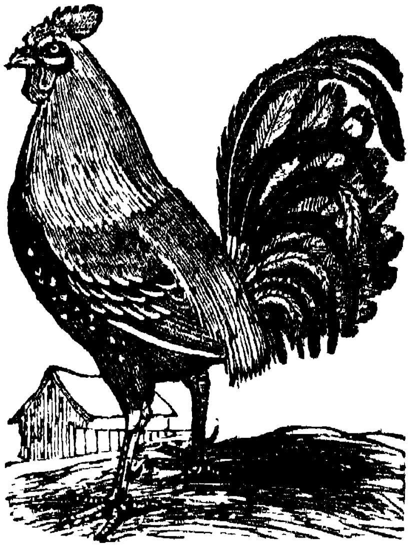
In this manner, all of this kind seem to lead an indolent, voluptuous life: as they are furnished internally with a very strong stomach, commonly called a gizzard, so their voraciousness scarce knows any bounds. If kept in close captivity, and separated from all their former companions, they still have the pleasure of eating left, and they soon grow fat and unwieldy in their prison. To say this more simply, many of the wilder species of birds, when cooped or caged, pine away, grow gloomy, and some refuse all sustenance whatever; none, except those of the poultry kind, grow fat, who seem to lose all remembrance of their former liberty, satisfied with indolence and plenty.



CHAP. II.

OF THE COCK.

All birds taken under the protection of man lose a part of their natural figure, and are altered not only in their habits but their very form. Climate, food, and captivity, are three very powerful agents in producing these alterations: and those birds that have longest felt their influence under human direction, are the most likely to have the greatest variety in their figures, their plumage, and their dispositions.


(The Cock.)

Of all other birds, the COCK seems to be the oldest companion of mankind, to have been first reclaimed from the forest, and taken to supply the accidental failure of the luxuries or necessities of life

It is not well ascertained when the cock was first made domestic in Europe; but it is generally agreed that we first had him in our western world from the kingdom of Persia. Persia itself, that first introduced it to our acquaintance, seems no longer to know it in its natural form; and if we did not find it wild in some of the woods of India, as well as some of the islands in the Indian Ocean, we might begin to doubt, as we do with regard to the sheep, in what form it first existed in a state of nature.

In their first propagation in Europe, there were distinctions then that now subsist no longer. The ancients esteemed those fowls whose plumage was redish as invaluable; but as for the white it was considered as utterly unfit for domestic purposes. The Athenians had their cock-matches as well as we; but it is probable they did not enter into our refinement of choosing out the most barren of the species for the purposes of combat.

However this be, no animal in the world has greater courage than the cock when opposed to one of his own species; and in every part of the world where refinement and polished manners have not entirely taken place, cock-fighting is a principal diversion. This extraordinary courage in the cock is thought to proceed from his being the most salacious of all other birds whatsoever. A single cock suffices for ten or a dozen hens; and it is said of him that he is the only animal whose spirits are not abated by indulgence. But then he soon grows old: the radical moisture is exhausted; and in three or four years he becomes utterly unfit for the purposes of impregnation. "Hens, also," to use the words of Willughby, "as they for the greatest part of the year daily lay eggs, cannot suffice for so many births, but for the most part after three years become effete and barren; for when they have exhausted all their seed eggs, of which they had but a certain quantity from the beginning, they must necessarily cease to lay, there being no new ones generated within."

The Hen seldom clutches a brood of chickens above once a season, though instances have been known in which they produced two. The number of eggs a domestic hen will lay in the year are above two hundred, provided she be well fed and supplied with water and liberty.* It matters not much whether she be trodden by the cock or not; she will continue to lay, although all the eggs of this kind can never by hatching be brought to produce a living animal. Her nest is made without any care, if left to herself; a hole scratched into the ground, among a few bushes, is the only preparation she makes for this season of patient expectation. Nature, almost exhausted by its own fecundity, seems to inform her of the proper time for hatching, which she herself testifies by a clucking note, and by discontinuing to lay. The good housewives, who often get more by their hens laying than by their chickens, artificially protract this clucking season, and sometimes entirely remove it. As soon as their hen begins to cluck, they stint her in her provisions; which, if that fails, they plunge her into cold water: this, for the time, effectually puts back her hatching, but then it often kills the poor bird, who takes cold and dies under the operation.

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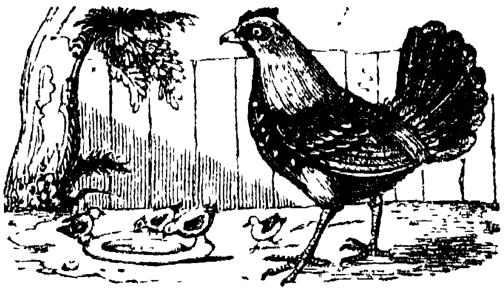
* Breeding Poultry.—The severities of the winters at New York require the employment of artificial heat, in order that the hens may lay all the winter, and that chickens may be reared all the year through. The houses for this purpose may be built either of brick



(Hen and Chickens.)

When the hen begins to sit, nothing can exceed her perseverance and patience; she continues for some days immovable; and when forced away by the importunities of hunger, she quickly returns. While the hen sits, she carefully turns her eggs, and even removes them to different situations; till at length, in about three weeks, the young brood begin to give signs of a desire to burst their confinement. When by the repeated efforts of their bills, which serve like a pioneer on this occasion, they have broken themselves a passage through the shell, the hen still continues to sit till all are excluded. The strongest and best chickens generally are the first candidates for liberty; the weakest come behind, and some even die in the shell. When all are produced, she then leads them forth to provide for themselves. Her affection and her pride seem then to alter her very nature, and correct her imperfections. No longer voracious or cowardly, she abstains from all food that her young can swallow, and flies boldly at every creature that she thinks is likely to do them mischief. Whatever the invading animal be, she boldly attacks him; the horse, the hog, or the mastiff. When marching at the head of her little troop, she acts the commander, and has a variety of notes to call her numerous train to their food, or to warn them of approaching danger.*

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or stone, one story high, with wooden roofs, and must be heated by cast-iron steam-pipes. Their ceilings and walls must be finished with Roman cement, in order to keep the houses free from vermin, which are apt to generate when heat is employed. Each house is to be divided into four compartments: the first for hatching and rearing chickens; the second for breeding turkeys; the third for ducks; and the fourth for geese. A furnace is to be built at one end, with a steam boiler to hold fifty gallons of water, which will heat a house eighty feet in length. The first two compartments must have the steam pipes pass around both rooms, at the bottom of the walls, for hatching chicken and turkey eggs, and they must pass once around the other two rooms, ducks and geese requiring less heat. The boiler must be also so constructed as to steam potatoes, parsnips, carrots, and herbs; which, when cooked, and mixed with milk, barley, oats, or peas, meal or flour, produce the finest chickens and other poultry.

To make the hens lay all through the winter, mix powdered oyster shells and slate, or decomposed schistus with their food. The lime in the oyster shells is necessary to form the shells of the eggs, and the slate improves their quality and flavour. Those hens are found to lay better-flavoured eggs which are bred on soils formed from decomposed schistus or granite.

By persevering in the above plan, a sufficient quantity of poultry might be obtained to supply London at one-half the prices generally charged, and yet allow a fair profit to the farmers; and an abundant supply of eggs in the winter would always be certain.—ARCANA OF SCIENCE, 1828.

* COURAGE OF THE FEATHERED CREATION.—The hen will attack any animal whatever in defence of her chickens; and has been known to lose her own life in attempting to save the life, as she thought, of a brood of young ducklings which she had hatched, on their entering the water.

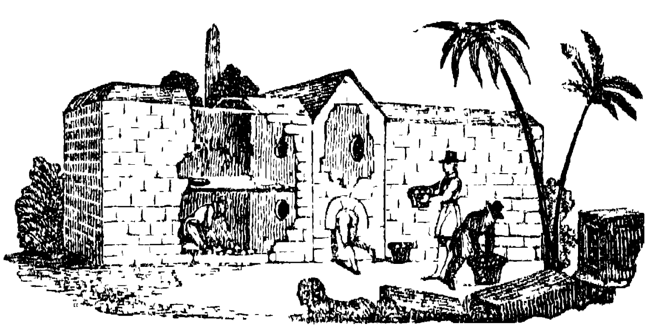
Ten or twelve chickens are the greatest number that a good hen can rear and clutch at a time; but as this bears no proportion to the number of her eggs, schemes have been imagined to clutch all the eggs of a hen, and thus turn her produce to the greatest advantage. By these contrivances it has been obtained that a hen that ordinarily produces but twelve chickens in the year, is found to produce as many chickens as eggs, and consequently often above two hundred. The contrivance I mean is the artificial method of hatching chickens in stoves, as is practised at Grand Cairo; or in a chemical elaboratory properly graduated, as has been effected by Reaumur.* At Grand Cairo, they thus produce six or seven thousand chickens at a time; where, as they are brought forth in their mild spring, which is warmer than our summer, the young ones thrive without clutching. But it is otherwise in our colder and unequal climate; the little animal may, without much difficulty, be hatched from the shell; but they

A singular instance of strong affection in the feathered tribe is related by Mr Jesse —"A gentleman in my neighbourhood," says he, "had directed one of his wagons to be packed with sundry hampers and boxes, intending to send it to Worthing, where he was going himself. For some time his going was delayed, and he therefore directed that the wagon should be placed in a shed in his yard, packed as it was, till it should be convenient for him to send it off. While it was in the shed, a pair of robins built their nest among some straw in the wagon, and had hatched their young just before it was sent away. One of the old birds, instead of being frightened away by the motion of the wagon, only left its nest from time to time for the purpose of flying to the nearest hedge for food for its young; and thus, alternately affording warmth and nourishment to them, it arrived at Worthing. The affection of this bird having been observed by the wagoner, he took care in unloading not to disturb the robin's nest, and my readers will, I am sure, be glad to hear, that the robin and its young ones returned in safety to Walton Heath, being the place from whence they had set out. The distance the wagon went in going and returning could not have been less than one hundred miles."—NATURAL HISTORY OF SELBORNE

ARTIFICIAL HATCHING - Under the reign of Augustus, Livia, the wife of that emperor, having heard that a man had succeeded in hatching chickens by the mere heat of his body, remaining in bed on the eggs for the same length of time as hens employ in incubation, bethought herself of hatching an egg by keeping it in her bosom It produced a little cock with a handsome crest. This circumstance excited great curiosity and interest. Attempts were renewed to find out the means of supplying the place of hens, [illegible] performing this operation on a grand scale. According to Pliny, eggs were deposited on straw, in a place heated by a gentle fire, and turned regularly by a man appointed for the purpose.

HATCHING IN EGYPT —The ovens, or hatching places, invented by the priests of that country, furnished in ancient times, one hundred millions of chickens in the year; and at present, when the population of that country is less, and the ovens are managed by simple peasants, who inherit the secret of those ancient priests, they still produce thirty millions in the same space of time. In the records of other nations, from the highest antiquity to our own days, we find no accounts of eggs artificially hatched, a few excepted which were brought to perfection by methods very different from those of the Egyptians.

It must be allowed that if the artificial mode could be brought to succeed in Europe, it would be very desirable. It is far more productive in Egypt than the natural incubation elsewhere If it succeeded, there would be no interruption to the laying of hens for the whole season. From various accidents it happens, that more than half the eggs which are incubated by hens, prove unproductive Now in Egypt, more than two-thirds of the eggs produce chickens. The conductor of one of these hatching establishments constantly returns 2,000 chickens for 3 000 eggs, and contents himself, as a recompense for his cares with the birds which are disclosed from the remaining thousand.



(Egyptian Egg-Oven)

almost all perish when excluded. To remedy this, Reaumur has made use of a woollen hen, as he calls it; which was nothing more than putting the young ones in a warm basket, and clapping over them a thick woollen canopy. I should think a much better substitute might be found; and this from among the species themselves.

The cock, from his salaciousness, is allowed to be a short lived animal; but how long these birds live, if left to themselves, is not yet well ascertained by any historian. As they are kept only for profit, and in a few years become unfit for generation, there are few that, from mere motives of curiosity, will make the tedious experiment of maintaining a proper number till they die. Aldrovandus hints their age to be ten years; and it is probable that this may be its extent. They are subject to some disorders, which it is not our business to describe; and as for poisons, besides nux vomica, which is fatal to most animals except man, they are injured, as Linnæus asserts, by elder-berries; of which they are not a little fond.*

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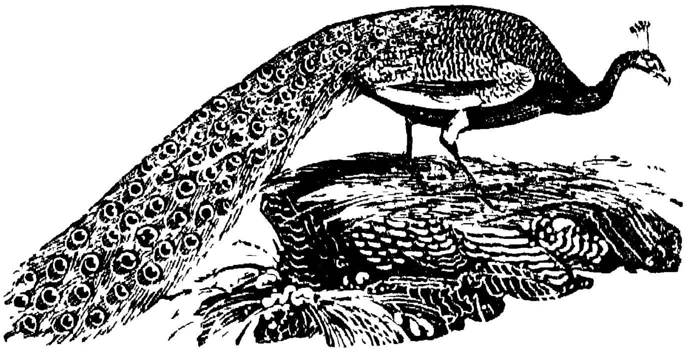
* LUSUS NATURÆ.—Cocks and hens, like other organized beings, exhibit occasionally monstrous productions, which have drawn the attention of the curious: chickens with two heads, cocks with four feet, &c. have been often described. A most singular production of this kind is described by M. Schwartz, in a periodical work printed at Berlin, entitled *Brennus*, in 1803.

"A Jew in 1802, exhibited for money, at Posen, in Poland, a hen with a human face, which was hatched in a farm, near Wryesnier, and which he had received in payment of a small debt. He declared that another chicken, altogether similar, had been in the same brood, but that it died. The animal which he exhibited, and which I have myself seen, was alive, and in excellent health. It had attained its full size, for it was more than a year old. Its body was covered with feathers, and it resembled other hens in every respect, except the head; this was of the usual size, but denuded of feathers, and covered with a bluish skin. The cavities of the eyes were completely formed like those of the human eye: they were surmounted by two small arches of down, which formed very regular eyebrows. The upper part of the bill was shorter than usual; it had but one blunted point, and the nostrils were underneath it; so that, although it was horn, it presented the perfect resemblance of a very well made nose; below this nose was a very regular mouth, with lips, two rows of very white teeth, close and pointed, and a rounded tongue, completed this most extraordinary *lusus naturæ*. This resemblance to a human countenance had something in it extremely disagreeable, and even horrid; but it was perfect, and had no need of the assistance of the imagination to be recognised."

FATTENING FOWLS. The epicurism of man has suggested various modes of fattening fowls excessively, all of which are unnatural, and more or less cruel. Their result, in fact, is always to produce disease, and some particularly of the liver. We must be excused from entering into any details respecting them. They only show how far a perverted taste will degrade civilized man, when he makes his intellectual faculties wholly subservient to the uncontrolled requisitions of his animal nature.

CHAP. III.

THE PEACOCK.



(The Peacock.)

THE PEACOCK, by the common people of Italy, is said to have the plumage of an angel, the voice of a devil, and the guts of a thief. In fact, each of these qualities mark pretty well the nature of this extraordinary bird. When it appears with its tail expanded, there is none of the feathered creation can vie with it for beauty; yet the horrid scream of its voice serves to abate the pleasure we find from viewing it; and still more, its insatiable gluttony and spirit of depredation make it one of the most noxious domestics that man has taken under his protection.

Our first peacocks were brought from the East Indies; and we are assured, that they are still found in vast flocks, in a wild state, in the islands of Java and Ceylon. So beautiful a bird, and one esteemed such a delicacy at the tables of the luxurious, could not be permitted to continue long at liberty in its distant retreats. So early as the days of Solomon, we find in his navies, among the articles imported from the East, apes and peacocks. Ælian relates, that they were brought into Greece from some barbarous country, and were held in such high esteem among them, that a male and female were valued at above thirty pounds of our money. We are told also, that when Alexander was in India, he found them flying wild, in vast numbers, on the banks of the river Hyarotis, and was so struck with their beauty, that he laid a severe fine and punishment on all who should kill or disturb them. Nor are we to be surprised at this, as the Greeks were so much struck with the beauty of this bird, when first brought among them, that every person paid a fixed price for seeing it; and several people came to Athens, from Lacedemon and Thessaly, purely to satisfy their curiosity.

It was probably first introduced into the West, merely on account of its beauty; but mankind, from contemplating its figure, soon came to think of serving it up for a different entertainment. Aufidius Hurco stands charged by Pliny with being the first who fatted up the peacock for the feast of the luxurious. Whatever there may be of delicacy in the flesh of a young peacock, it is certain an old one is very indifferent eating; nevertheless, there is no mention made of choosing the youngest; it is probable they were killed indiscriminately, the beauty of the feathers in some measure stimulating the appetite. Hortensius the orator was the first who served them up at an entertainment at Rome; and from that time they were considered as one of the greatest ornaments of every feast. Whether the Roman method of cookery, which was much higher than ours, might not have rendered them more palatable than we find them at present, I cannot tell: but certain it is, they talk of the peacock as being the first of viands.

Like other birds of the poultry kind, the peacock feeds upon corn; but its chief predilection is for barley. But as it is a very proud and fickle bird, there is scarce any food that it will not at times covet and pursue. Insects and tender plants are often eagerly sought at a time that it has a sufficiency of its natural food provided more nearly. In the indulgence of these capricious pursuits, walls cannot easily confine it; it strips the tops of houses of their tiles or thatch, it lays waste the labours of the gardener, roots up his choicest seeds, and nips his favourite flowers in the bud. Thus its beauty but ill recompenses for the mischief it occasions; and many of the more homely-looking fowls are very deservedly preferred before it.

Nor is the peacock less a debauchee in its affections, than a glutton in its appetites. He is still more salacious than even the cock; and though not possessed of the same vigour, yet burns with more immoderate desire. He requires five females at least to attend him; and if there be not a sufficient number, he will even run upon and tread the sitting hen. For this reason, the peahen endeavours, as much as she can, to hide her nest from the male, as he would otherwise disturb her sitting, and break her eggs.

The peahen seldom lays above five or six eggs in this climate before she sits. Aristotle describes her as laying twelve; and it is probable in her native climate, she may be thus prolific; for it is certain, that in the forests where they breed naturally, they are numerous beyond expression. The bird lives about twenty years; and not till its third year has it that beautiful variegated plumage that adorns its tail.

There are varieties of this bird, some of which are white, others crested: that which is called the Peacock of Thibet, is the most beautiful of the feathered creation, containing in its plumage all the most vivid colours, red, blue, yellow, and green, disposed in an almost artificial order, as if merely to please the eye of the beholder.*

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* WHITE PEACOCKS.—"Climate has not less influence on the plumage of birds than on the fur of quadrupeds. We have seen that the hare, the ermine, and most other animals, are subject to become white in cold countries, especially in winter; and now we find a species of peacock, which appears to have experienced the same results from the same cause, and more important ones still; for this cause has produced a permanent race in this species, and seems to have acted more powerfully upon the feathers of this bird, since the whiteness of hares and ermines is but transient, taking place during the winter only, like that of the wood-hen and lagopus. But the white peacock is always white, in all countries, in summer as in winter, at Rome as in Torneo; and this new colour has become so fixed, that from eggs laid and hatched in Italy, come white peacocks."—BUFFON.

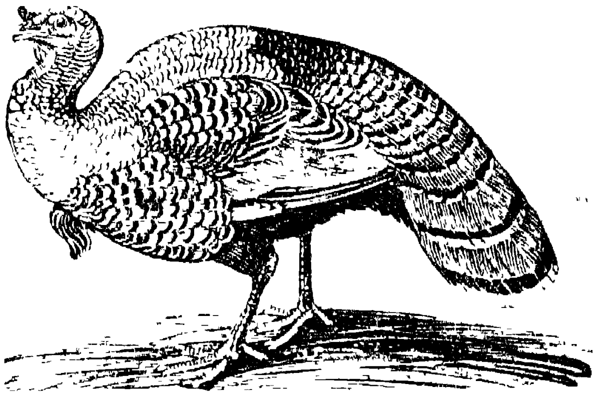
"The race of white peacocks is not essentially original to the north, for in 1783 a pair of common peacocks produced, at Gentilli, near Paris, four young ones, two of which preserved the plumage of their parents, and two were entirely white. Nevertheless, Mauduyt, who relates this fact, observes that there was no white peacock in the village, nor in the environs. The same thing occurred, a few years before, in an estate equally near Paris. It then appears, that the whiteness of the plumage of the peacock is a simple accidental variety, which one cannot regard as forming a permanent race; and what seems to prove this still more is, that these white peacocks are very rare."—SONNINI, *French Encyclopedia*.

In the Royal Menagerie at Windsor there is at present, or was very lately, a most beautiful specimen of the white peacock.—ED.

Although the plumage of the white peacock is altogether of this colour, the long plumes of the train do yet retain, at their extremities, some vestiges of the brilliant mirrors peculiar to the species; and all the rest of their livery carries the impression of the different colours, though feebly sketched with a white more or less pure. The variety of white peacocks is not very common, and these birds always bear a higher price than the others. They are exceedingly handsome, and produce an admirable effect in the midst of a flock of richly decorated peacocks.

CHAP. IV.

THE TURKEY.



(The Turkey.)

THE natal place of the cock and the peacock is pretty well ascertained, but there are stronger doubts concerning the TURKEY, some contending that it has been brought into Europe from the East Indies many centuries ago; while others assert that it is wholly unknown in that part of the world, that it is a native of the new continent, and that it was not brought into Europe till the discovery of that part of the world.*

With us, when young, it is one of the tenderest of all birds; yet in its wild state, it is found in great plenty in the forests of Canada, that are covered with snow above three parts of the year. In their natural woods, they are found much larger than in their state of domestic captivity. They are much more beautiful also, their feathers being of a dark grey, bordered at the edges with a bright gold colour. These the savages of the country weave into cloaks to adorn their persons, and fashion into fans and umbrellas, but never once think of taking into keeping animals that the woods furnish them with in sufficient abundance. Savage man seems to find a delight in precarious possession. A great part of the pleasure of the chase lies in the uncertainty of the pursuit, and he is unwilling to abridge himself in any accidental success that may attend his fatigues. The hunting the turkey, therefore, makes one of his principal diversions; as its flesh contributes chiefly to the support of his family. When he has discovered the place of their retreat, which, in general, is near fields of nettles, or where there is plenty of any kind of grain, he takes his dog with him, which is trained to the sport, (a faithful, rough creature, supposed to be originally reclaimed from the wolf) and he sends him into the midst of the flock. The turkeys no sooner perceive their enemy, than they set off running at full speed, and with such swiftness that they leave the dog far behind them: he follows nevertheless, and sensible they must soon be tired, as they cannot go full speed for any length of time, he at last forces them to take shelter in a tree, where they sit quite spent and fatigued, till the hunter comes up, and with a long pole, knocks them down one after the other.

This manner of suffering themselves to be destroyed, argues no great instinct in the animal; and indeed, in their captive state, they do not appear to be possessed of much. They seem a stupid, vain, querulous tribe, apt enough to quarrel among themselves, yet without any weapons to do each other an injury. Every body knows the strange antipathy the turkey-cock has to a red colour; how he bristles, and with his peculiar gobbling sound, flies to attack it. But there is another method of increasing the animosity of these birds against each other, which is often practised by boys, when they have a mind for a battle. This is no more than to smear over the head of one of the turkeys with dirt, and the rest run to attack it with all the speed of impotent animosity: nay, two of them thus disguised, will fight each other till they are almost suffocated with fatigue and anger.

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* ORIGINALLY NATIVE OF.—We find the turkey in a state of liberty in no other latitudes than those of America. Father Bouzzes, the Jesuit, for instance, tells us, that there are no wild turkeys in the peninsula within the Ganges. Dampier saw none at Mindanao Chardin and Tavernier, who traversed most parts of Asia, declare positively that no wild turkeys are to be found throughout that vast extent of territory. According to the last-mentioned of these travellers, it was the Armenians who imported them into Persia, where they have not thrived very successfully. The Hollanders brought them to Batavia, where they have prospered much better. In Congo and on the Gold Coast, turkeys are found only in the factories, established there by the Europeans. which renders it quite evident that they are not natives of Africa. It is now universally allowed that the turkey is originally a native of America.

But though so furious among themselves, they are weak and cowardly against other animals, though far less powerful than they. The cock often makes the turkey keep at a distance; and they seldom venture to attack him but with united force, when they rather oppress him by their weight, than annoy him by their arms. There is no animal, how contemptible soever, that will venture boldly to face the turkey-cock, that he will not fly from. On the contrary, with the insolence of a bully, he pursues any thing that seems to fear him, particularly lap-dogs and children, against both which he seems to have a peculiar aversion. On such occasions, after he has made them scamper, he returns to his female train, displays his plumage around, struts about the yard, and gobbles out a note of self-approbation.*

The female seems of a milder, gentler disposition. Rather querulous than bold, she hunts about in quest of grain, and pursuit of insects, being particularly delighted with the eggs of ants and caterpillars. She lays eighteen or twenty eggs, larger than those of a hen, whitish, but marked with spots resembling the freckles of the face. Her young are extremely tender at first, and must be carefully fed with curd chopped with dock leaves; but as they grow older, they become more hardy, and follow the mother to considerable distances, in pursuit of insect food, which they prefer to any other. On these occasions,

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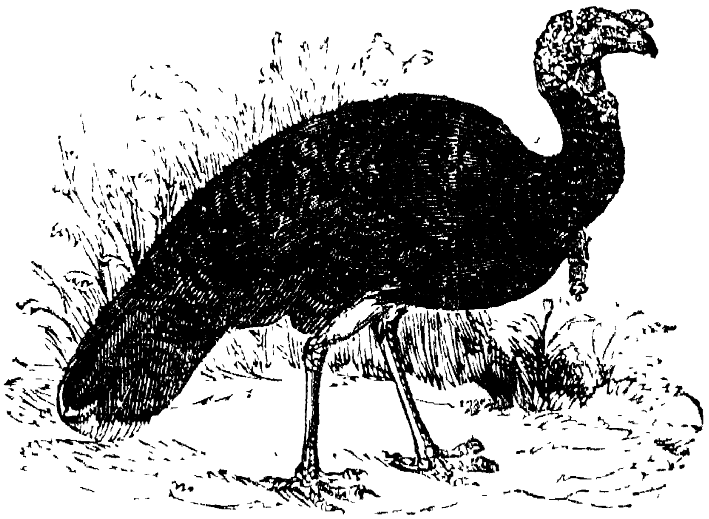
* WILD TURKEYS.—The wild turkeys are much more bulky than the domestic turkeys, weighing from twenty even to sixty pounds. The wild turkeys fly in numerous flocks of many hundreds. They frequent woods and coppices during the day, where they feed on acorns. They return in the evening into marshes, where they pass the night. Wild turkeys are found from the country of the Illinois, as far as the Isthmus of Panama. The birds which travellers have met more to the southward, and mistaken for turkeys are hoccos. They live for the most part in forests, and feed on wild fruits: the acorn of the green oak fattens them very much. Their flesh is preferable to that of the domestic breed, and its flavour approaches to that of the pheasant. These birds quit the woods in the months of September, and approach inhabited places; accordingly the natives of North America call this season the *turkey month.* They then hunt them, and kill great numbers, which are preserved in ice, and brought into the European establishments. The wild turkeys are now to be met with only very far in the interior. They are extremely shy, and though their flight is heavy, they know so well how to escape and conceal themselves, that they are procured with difficulty. Those that are brought up in their native country, and which lead a rural life, and are never shut up, have yet become as degenerate as those of our poultry yards in Europe.

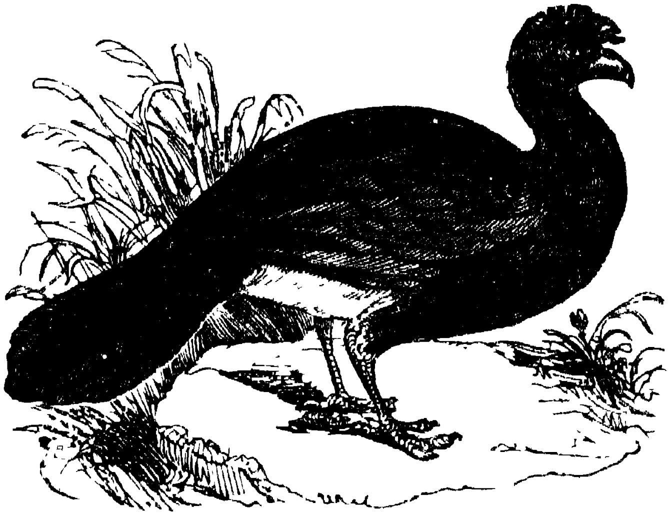


(The Wild Turkey.)

however, the female, though so large, and as it would seem, so powerful a bird, gives them but very little protection against the attacks of any rapacious animal that comes in her way. *She* rather warns her young to shift for themselves, than prepares to defend them.

When once grown up, turkeys are very hardy birds, and feed themselves at very little expense to the farmer. Those of Norfolk are said to be the largest of this kingdom, weighing from twenty to thirty pounds. There are places, however, in the East Indies, where they are known only in their domestic state, in which they grow to the weight of sixty pounds.*

* Gallinaceous Birds.—A great variety of these birds, which might easily be added to our domestic poultry, are peculiar to America. Such are especially the curassows. In many parts of South America these birds have long been reclaimed; and it is really surprising, considering the extreme familiarity of their manners, and the facility with which they appear to pass from a state of nature to the tameness of domestic fowls, that they have been not yet introduced to the poultry yards of Europe. That, with proper treatment, they would speedily become habituated to the climate, we have no reason to doubt; on the contrary, numerous examples have shown that they thrive well even in its northern parts; and M. Temminck informs us that they have, once at least, been thoroughly acclimated in Holland, where they were as prolific, in their domesticated state, as any of our common poultry. The establishment, however, in which this had been effected, was broken up by the civil commotions which followed in the train of the French revolution, and all the pains which had been bestowed on the education of these birds were lost to the world by their sudden and complete dispersion. The task, which had at that time been in some measure accomplished, still remains to be performed; and it may not be too much to expect that the Zoological Society may be successful in perfecting what was then so well begun, and in naturalizing the curassows as completely as our ancestors have done the equally exotic, and in their wild state, much less familiar, breeds of turkey, the guinea-fowl, and the peacock. Their introduction would certainly be most desirable, not merely on account of their size and beauty, but also for the whiteness and excellence of their flesh, which surpasses the pheasant in flavour.


(The Curassow.)

The Curassow.—From the various species of this bird we select one, the crested curassow. Its plumage is of a deep black, with a slight gloss of green upon the head, crest, neck, back, wings, and upper part of the tail; and dull white beneath, and on the lower tail-coverts. Its crest is from two to three inches in length, and occupies the whole upper surface of the head: it is curled and velvety in its appearance, and capable of being raised or depressed at will, in accordance with the temporary feelings by which this bird is actuated. The eyes are surrounded by a naked skin, which extends into the cere, and there assumes a bright yellow colour. In size the bird is almost equal to a turkey. This species is a native of Mexico, Guiana, and Brazil, and probably extends itself over a large portion of the southern division of the American continent. They congregate in numerous flocks, and appear to be under little or no uneasiness from the intrusion of men into their haunts. Even when a considerable number of them have been shot, the rest remain quietly perched upon the trees, apparently unconscious of the havoc. This conduct is by no means the result of stupidity, but proceeds rather from the natural tameness and unsuspiciousness of their character. They build their nests on the trees, forming them externally of branches interlaced with the stalks of herbaceous plants, and lining them with leaves. They generally lay but once a year, during the rainy season, the number of their eggs being from six to eight.

CHAP. V.

THE PHEASANT.

It would surprise a sportsman to be told that the **PHEASANT** which he finds wild in the woods, in the remotest parts of the kingdom, and in forests, which can scarce be said to have an owner, is a foreign bird, and was at first artificially propagated among us. They were brought into Europe from the banks of the Phasis, a river of Colchis, in Asia Minor; and from whence they still retain their name.

(The Pheasant.)

Next to the peacock, they are the most beautiful of birds, as well for the vivid colour of their plumes, as for their happy mixtures and variety. It is far beyond the power of the pencil to draw anything so glossy, so bright, or points so finely blending into each other. We are told, that when Crœsus, king of Lydia, was seated on his throne, adorned with royal magnificence, and all the barbarous pomp of eastern splendour, he asked Solon if he had ever beheld any thing so fine! The Greek philosopher, no way moved by the objects before him, or taking a pride in his native simplicity, replied that after having seen the beautiful plumage of the pheasant, he could be astonished at no other finery.

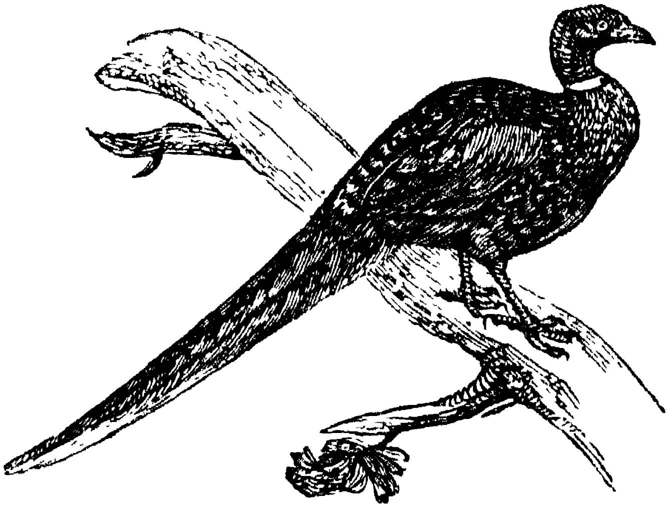
This bird though so beautiful to the eye, is not less delicate when served up to the table. Its flesh is considered as the greatest dainty; and when the old physicians spoke of the wholesomeness of any viands, they made their comparison with the flesh of the pheasant. However, notwithstanding all these perfections to tempt the curiosity or the palate, the pheasant has multiplied in its wild state; and, as if disdaining the protection of man, has left him, to take shelter in the thickest woods and the remotest forests. This spirit of independence seems to attend the pheasant even in captivity. In the woods, the hen pheasant lays from eighteen to twenty eggs in a season; but in a domestic state she seldom lays above ten. In the same manner, when wild, she hatches and leads up her brood with patience, vigilance, and courage; but when kept tame, she never sits well; so that a hen is generally her substitute on such occasions; and as for leading her young to their food, she is utterly ignorant of where it is to be found; and the young birds starve, if left solely to her protection. The pheasant, therefore, on every account, seems better left at large in the woods, than reclaimed to pristine captivity. Its fecundity when wild is sufficient to stock the forest; its beautiful plumage adorns it; and its flesh retains a higher flavour from its unlimited freedom.

However, it has been the aim of late to take these birds once more from the woods, and to keep them in places fitted for their reception. Like all others of the poultry kind, they have no great sagacity, and suffer themselves easily to be taken. At night they roost upon the highest trees of the wood; and by day they come down into the lower brakes and bushes, where their food is chiefly found They generally make a kind of flapping noise when they are with the females, and this often apprizes the sportsman of their retreats. At other times he tracks them in the snow, and frequently takes them in springes. But of all birds they are shot most easily, as they always make a whirring noise when they rise, by which they alarm the gunner, and being a large mark, and flying very slow, there is scarce any missing them.

> "Ah! what avail his glossy, varying dyes,
> His purpled crest and scarlet-circled eyes,
> The vivid green his shining plumes unfold,
> His painted wings, and breast that flames with gold?"—Pope.

When these birds are taken young into keeping, they become as familiar as chickens; and when they are designed for breeding, they are put together in a yard, five hens to a cock; for this bird, like all of the poultry kind, is very salacious. In her natural state, the female makes her nest of dry grass and leaves; the same must be laid for her in the pheasantry, and she herself will sometimes properly dispose them. If she refuses to hatch her eggs, then a common hen must be got to supply her place, which task she will perform with perseverance and success. The young ones are very difficult to be reared; and they must be supplied with ants' eggs, which is the food the old one leads them to gather when wild in the woods. To make these go the farther, they are to be chopped up with curds or other meat; and the young ones are to be fed with great exactness; both as to the quantity and the time of their supply. This food is sometimes also to be varied, and woodlice, earwigs, and other insects, are to make a variety. The place where they are reared must be kept extremely clean; their water must be changed twice or thrice a day; they must not be exposed till the dew is off the ground in the morning; and they should always be taken in before sunset. When they become adult, they very well can shift for themselves; but they are particularly fond of oats and barley.*

The pheasant, when full grown, seems to feed indifferently upon every thing that offers. It is said by a French writer, that one of the king's sportsmen shooting at a parcel of crows, that were gathered round a dead carcass, to his great surprise upon coming up, found that he had killed as many pheasants as crows.†


(The Ring-tailed Pheasant.)

Of the pheasant, as of all other domestic fowl, there are many varieties. There are white pheasants, crested pheasants, spotted pheasants; but of all others, the golden pheasant of China is the most beautiful. It is a doubt whether the peacock itself can bear the comparison. However, the natives of China would not have us consider it as their most beautiful bird, though covered all over with eyes, resembling in miniature those of a peacock.[*] By their accounts, it is far exceeded by the fong-whang, an imaginary bird, of which they give a most fantastic description. It is thus that the people of every country, though possessed of the greatest advantages, have still others that they would persuade strangers they enjoy, which have existence only in the imagination.

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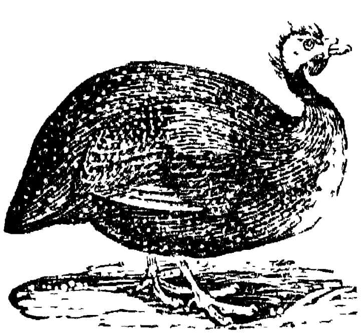
* Young Pheasants.—It is of great importance to be very particular about the water which is given to the young pheasants. It should be of the best quality, and constantly renewed. Inattention in this respect exposes the young pheasants to a malady very common with chickens, called the pip.

† Food.—Whenever the pheasant has been observed busily pecking at carrion, it has not been devouring the flesh, but picking off the maggots and animalculæ which have been produced by the striking of flies, and of which, as well as of insects in general, it is remarkably fond.—Ed.

CHAP. VI.

THE PINTADA OR GUINEA-HEN.



(The [illegible] hen)

This is a very remarkable bird, and in some measure unites the characteristics of the pheasant and the turkey. It has the fine delicate shape of the one, and the bare head of the other. It is well known all over Europe, and even better than with us, as the nations that border on the Mediterranean probably had it before us from those parts of Africa which lay nearest. Accordingly, we find it in different countries called by different names, from the place whence they had it. They are by some called the Barbary hen; by others, the Tunis bird; and by others, the bird of Numidia.[†] We have given it the name of that part of Africa from whence probably it was first brought.

In many parts of their native country, they are seen in vast flocks together, feeding their young, and leading them in quest of food. All their habits are like those of the poultry kind, and they agree in every other respect, except that the male and female are so much alike, that they can hardly be distinguished asunder. Their eggs, like their bodies, are speckled; in our climate, they lay but five or six in a season, but they are far more prolific in their sultry regions at home. They are kept among us rather for show than use, as their flesh is not much esteemed, and as they give a good deal of trouble in the rearing.

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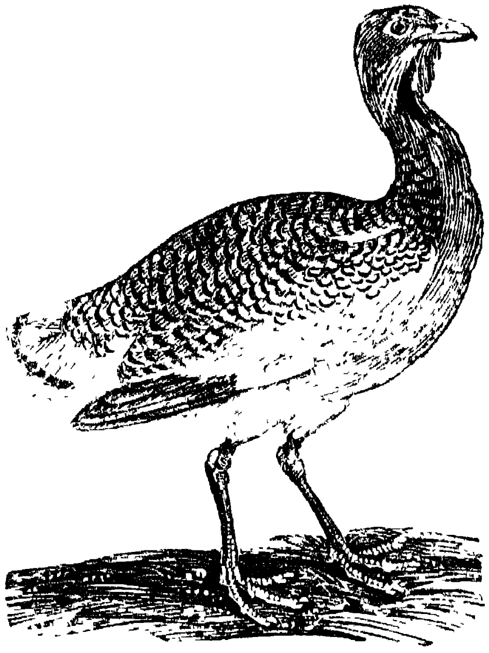
[*] The Superb Pheasant, or the *Golden Pheasant* here spoken of.-- Its existence was considered for a long time doubtful. The descriptions by various authors of this fine and rare bird, have been very vague and imperfect. Montbelliard simply tells us of a pheasant in the north of China, remarkable for the eyes on its wings and tail, and the length of the two middle tail-feathers. "We shall not attempt to enlarge on the description of this bird. In fact, no language could represent the various tints and demi-tints, and shades, that prevail throughout its plumage. It would seem as if nature, after having lavished, and, as it were, exhausted all her brilliancy of colouring on so many birds, had taken a pleasure in assembling upon this every variety of her soberer hues; unsatisfied with having charmed our sight with the resplendency of purple, gold, and azure in the peacock, the bird of Paradise, and the humming-bird, she appears desirous of revealing to us all the resources of her art, by producing the most elegant and harmonious shades even from the refuse of her inimitable pallet."—Griffith.

[†] The Bird of Numidia.—The pintada is the bird formerly known to the ancients under the name of Meleagris or Numidian fowl. Its flesh was much esteemed by the Romans. Among the varieties of this bird are the crested pintada, and the mitred pintada.

CHAP. VII.

THE BUSTARD.



(The Bustard.)

The BUSTARD is the largest land-bird that is a native of Britain. It once much more numerous than it is at present; but the increased cultivation of the country, and the extreme delicacy of its flesh, has greatly thinned the species; so that a time may come when it may be doubted whether ever so large a bird was bred among us. It is probable that long before this the bustard would have been extirpated, but for its peculiar manner of feeding. Had it continued to seek shelter among our woods, in proportion as they were cut down, it must have been destroyed. If in the forest, the fowler might approach it without being seen; and the bird, from its size, would be too great a mark to be easily missed. But it inhabits only the open and extensive plain, where its food lies in abundance, and where every invader may be seen at a distance.

The bustard is much larger than the turkey, the male generally weighing from twenty-five to twenty-seven pounds. The neck is a foot long, and the legs a foot and a half. The wings are not proportionable to the rest of the body, being but four feet from the tip of one to the other; for which reason the bird flies with great difficulty. The head and neck of the male are ash-coloured; the back is barred transversely with black, bright, and rust colour. The greater quill feathers are black; the belly white; and the tail, which consists of twenty feathers, is marked with broad black bars.

It would seem odd, as was hinted before, how so large a land-bird as this could find shelter in so cultivated a country as England; but the wonder will cease when we find it only in the most open countries, where there is scarce any approaching it without being discovered. They are frequently seen in flocks of fifty or more, in the extensive downs of Salisbury Plain, in the heaths of Sussex and Cambridgeshire, the Dorsetshire uplands, and so on as far as East Lothian in Scotland.* In those extensive plains, where there are no woods to screen the sportsman, nor hedges to creep along, the bustards enjoy an indolent security. Their food is composed of the berries that grow among the heath, and the large earthworms that appear in great quantities on the downs before sunrising in summer. It is in vain that the fowler creeps forward to approach them, they have always sentinels placed at proper eminences, which are ever on the watch, and warn the flock of the smallest appearance of danger. All therefore that is left the sportsman, is the comfortless view of their distant security. He may wish, but they are in safety.

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* THE BUSTARD.—Goldsmith observes that these birds frequently abounded on Salisbury plain, but they are now so scarce on the downs of Wiltshire, that the shepherds declare they have not seen one in their most favourite haunts for years. All the artful means to keep and domesticate them, so as to increase them, have proved abortive.

Selby informs us that his inquiries led him to the conclusion that the breed was now entirely extinct. In 1804 one was shot and taken to Plymouth market, where it was sold for *a shilling!* Both buyer and seller little understood the value of this ornithological rarity. It is common in some parts of Germany and the deserts of Tartary, also in Russia.

There are eleven species of bustards, but only two, the great and little bustard, are natives of our island.

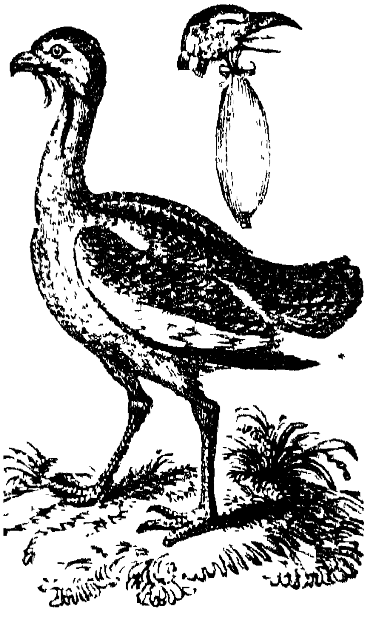
It sometimes happens that these birds, though they are seldom shot by the gun, are often run down by greyhounds. As they are voracious and greedy, they often sacrifice their safety to their appetite, and feed themselves so very fat, that they are unable to fly without great preparation. When the greyhound, therefore, comes within a certain distance, the bustard runs off flapping its wings, and endeavouring to gather air enough under them to rise; in the mean time, the enemy approaches nearer and nearer, till it is too late for the bird even to think of obtaining safety by flight; for just at the rise there is always time lost, and of this the bird is sensible; it continues, therefore, on the foot, until it has got a sufficient way before the dog for flight, or until it is taken.

As there are few places where they can at once find proper food and security, so they generally continue near their old haunts, seldom wandering above twenty or thirty miles from home. As their food is replete with moisture, it enables them to live upon these dry plains, where there are scarcely any springs of water, a long time without drinking. Besides this, nature has given the males an admirable magazine for their security against thirst. This is a pouch, the entrance of which lies immediately under the tongue, and capable of holding near seven quarts of water. This is probably filled upon proper occasions, to supply the hen when sitting, or the young before they can fly.*

Like all other birds of the poultry kind, they change their mates at the season of incubation, which is about the latter end of summer. They separate in pairs if there be a sufficiency of females for the males; but when this happens to be otherwise, the males fight until one of them falls. In France, they often find some of those victims to gallantry dead in the fields, and no doubt are not displeased at the occasion.

They make their nests upon the ground, only just scraping a hole in the earth, and sometimes lining it with a little long grass or straw. There they lay two eggs only, almost of the size of a goose-egg, of a pale olive brown, marked with spots of a darker colour. They hatch for about five weeks, and the young ones run about as soon as they are out of the shell.

The bustards assemble in flocks in the month of October, and keep together



(Bustard with Water-pouch.)

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* Water Pouch.—The size of this reservoir seems something exaggerated: for with an addition of nearly fourteen pounds weight thrown forwards, the centre of gravity must be so much overbalanced as to destroy its power of flight, and impede its running. About half the quantity seems a probable sufficiency for all its wants. This singular reservoir was first discovered by Dr. Douglas, who supposes that the bird fills it with water, to supply its thirst in the middle of those extensive plains where it is accustomed to wander. It likewise makes a further use of it in defending itself against the attacks of birds of prey: on these occasions, it throws out the water with such violence, as not unfrequently to baffle the pursuit of the enemy

till April. In winter, as their food becomes more scarce, they support themselves indiscriminately, by feeding on moles, mice, and even little birds, when they can seize them. For want of other food, they are content to live upon turnip-leaves, and such like succulent vegetables. In some parts of Switzerland, they are found frozen in the fields in severe weather; but when taken to a warm place they again recover. They usually live fifteen years, and are incapable of being propagated in a domestic state, as they probably want that food which best agrees with their appetite.*

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* Bustard Species.—There are eleven species of this bird, of which the great and little bustard are the only natives of the kind in our island. The little bustard is very uncommon in this country. It is very common in France, where it is taken in nets like partridges. It is a very shy and cunning bird; if disturbed, it flies two or three hundred paces not far from the ground, and then runs away much faster than one can follow on foot. The female lays her eggs in June, to the number of three or four, of a glossy green colour: as soon as the young are hatched, she leads them about as the hen does her chickens They begin to fly about the middle of August Both this and the great bustard are excellent eating; and we should imagine, would well repay the trouble of domestication: indeed, it seems surprising that we should suffer these fine birds to run wild, and be in danger of total extinction, which, if properly cultivated, might afford as excellent a repast as our own domestic poultry, or even as the turkey, for which we are indebted to distant countries.

The Rhea.—There is a family of birds, containing a limited number of genera, and these genera (one only being excepted) each a single species only, which in many essential points, offers a striking modification of the characters obtaining so generally among the feathered race The family we allude to is that termed *Struthionidæ*, comprehending the ostrich (*struthio*), the emeu (*dromaius*), the cassowary (*casuarius*), the rhea (*rhea*), and the bustard (*otis*).

If we except the bustard, which, departing from the typical form of its family, may be regarded as the link of union between the *Struthionidæ* and other families of the rasorial order, we shall find these genera, allied among themselves, to be surrounded by a clear line of demarcation. We are accustomed to look upon birds as denizens of the air; as made for flight; as beings winging their way through the blue sky from grove to grove, and from clime to clime; but here we see an exception; we see a race of birds incapable of raising themselves from the earth, to whose surface they are bound. It is true they have wings, but what wings!—the skeleton of these organs is small and undeveloped, and they are furnished, not with a dense and well-compacted mass of feathers with stiff shafts, and vanes composed of barbes, close and adhesive; not with firm, springy quill feathers, with which to strike the air; but they are either devoid of plumage, as in the emeu of New Holland, or the cassowary of the Indian Archipelago, or furnished with loose and waving plumes, having barbes floating and disconnected. The neck is long, the beak rounded at the tip and flattened; the eyes are large, and the eyelids are fringed with lashes. If the wings are only rudimentary, the contrary is the case with the legs, where the whole force of the system is, as it were, concentrated. Formed for scouring the wilds and the deserts, it was necessary to endow these birds with the power of outstripping "the steed and his rider;" we accordingly see the thighs extraordinarily muscular and powerful, the tarsi or legs long, and covered with hard scales; the toes limited in number, being at most only three, but in the ostrich only two, terminated not with claws, but absolutely with hoofs, analogous to those of the deer or antelope. The hind toe is always absent, not even a vestige of it appearing: thus gifted for the course, they need not wings: their speed is their safety. Of all birds their bulk is the greatest; their appearance is striking and imposing; the general plumage of the body is loose, the feathers being either plume-like, or elongated, slender, and hair-like Such are their external characters, and as much as they externally differ from the feathered tribes in general, so much also is their internal structure modified.

To have given these terrestrial birds strong and massive pectoral muscles for bringing down their wings with force, would have been a kind of physical contradiction which we never see in nature. Their pectoral muscles are small and feeble, and the breast bone, therefore, instead of having that deep keel which serves in birds of flight for the attachment of these voluminous muscles, is small and flat, or rather shield-like; and in some species, as the ostrich, is covered with a naked, callous skin, on which the creature rests. The stomach is complex. Between the crop, which is very large, and the gizzard, there is an intervening stomach (*pro-ventriculus*), furnished with a glandular apparatus, for secreting a powerful solvent fluid, analogous to the gastric juice of mammalia, by which the food is prepared for the grinding process it has to undergo in the gizzard. The food consists of vegetable matters principally, to which insects and even reptiles are also added.

The gizzard of these birds, and indeed of the birds of the rasorial order generally, we always find to be more or less filled with hard pebbles. These are not swallowed by mistake, they are absolutely essential to the creature's existence: deprive a bird of this tribe of the power of obtaining them, and it starves in the midst of plenty; and why? they serve as millstones for grinding the food, previously softened and prepared, to a paste, from which, in that state alone, the absorbents can take up the nutritive particles.

By these preliminary remarks we introduce the rhea, or South American ostrich (*rhea Americana*, Temm.) a bird which, though common in its native country, is seldom brought alive to Europe; and, indeed, has, until the last few years, been among the ranks of obscure or doubtful species. Among the older writers, Margrave gives a tolerable account, which Willughby has copied; and Molina also notices the bird in his "History of Chili."

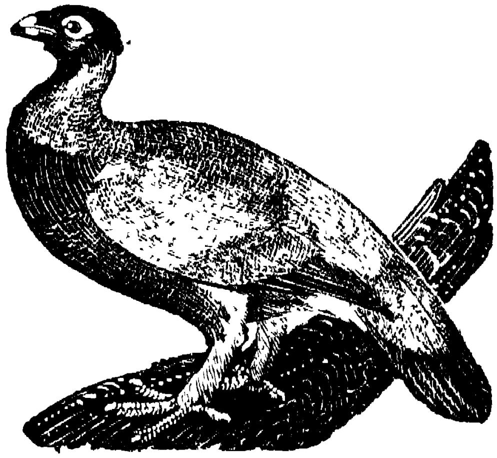
It appears to be diffused over the whole of South America, but is especially plentiful in the neighbourhood of the lake Nahuelguapi, in the valley of the Andes. It is a voracious feeder, devouring every thing indiscriminately, like the ostrich; fruits and vegetables are its staple diet, but it is said to be very fond of flies, which it catches with peculiar address. Azara informs us that it abounds on the borders of the river La Plata, and is generally seen in the open parts in pairs, though sometimes in flocks of thirty. The nest is only a large hole scraped in the earth, with a little straw at the bottom.

The usual way of taking the rhea is by slings with stones at the ends, which are thrown so as to entangle the legs; at other times they are shot; to overtake them is difficult even on horseback.

The rhea stands about five feet five inches or rather more, in its natural attitude; its general colour is a greyish brown, intermingled with black, but lighter below. The base of the neck is encircled by black, which passes on the breast into a semi-lunar mark, pointing to each shoulder. The plumes of the wings are long and slender, and those answering to the quill feathers are white. Those plumes are an abundant article of commerce (rare as the bird or even specimens of it are in Europe), and are fixed at the end of a handle, and used as dusting brushes for trifling purposes. The female is smaller, and of a lighter colour.

CHAP VIII.

THE GROUSE AND ITS AFFINITIES.



(The Wood-Grouse.)

The COCK OF THE WOOD, the BLACK COCK, the GROUSE, and the PTARMIGAN; these are all birds of a similar nature, and chiefly found in heathy mountains and piny forests, at a distance from mankind.* They might once indeed have been common enough all over England, when a great part of the country was covered with heath; but at present their numbers are thinned: the two first of this kind are utterly unknown in the south, and have taken refuge in the northern parts of Scotland, where the extensive heaths afford them security, and the forests shelter.†

The cock of the wood is sometimes of the size of a turkey, and often weighs near fourteen pounds; the black cock, of which the male is all over black, though the female is of the colour of a partridge, is about the size of a hen, and, like the former, is only found with us in the Highlands of Scot-

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* **Grouse Shooting**.—The Scotch grouse are larger and finer birds than those found in England, which arises from the climate and greater extent of country it has to roam over. The finest grouse-shooting is to be obtained in the Highlands of Scotland; but there are likewise many parts of the Lowlands upon which immense numbers both of black and red game are to be found. The mountains of Selkirkshire, and the collateral ridges which run down the vale of Teviot, both on the Scottish and English side of the borders, are splendidly stocked with moor game. Yet the preference is given by the sportsman to the Highlands, as grouse of all kinds are to be met with there, along with the alpine, or white hare, and the valleys are stocked with partridge and the common hare. There are grouse on the mountains of Wales, but the sport there to be obtained is not of the first order. Ireland affords excellent shooting.—Ed.

† **The Black Cock**.—This bird, though not larger than the common hen, weighs nearly four pounds. These birds are found chiefly in high and woody situations in the northern parts of our island; they are common in Russia, Siberia, and other northern countries: they feed on various kinds of berries and other fruits, the produce of wild and mountainous places. In summer they frequently come down from their lofty situations, for the sake of feeding upon corn. They do not pair; but on the return of spring, the males assemble in great numbers, at their accustomed resorts, on the tops of high and heathy mountains, when the contest for superiority commences, and continues with great bitterness till the vanquished are put to flight. The victors, being left in possession of the field, place themselves on an eminence, clap their wings, and with loud cries give notice to their females, who immediately resort to the spot. It is said that each cock has two or three hens, which seem particularly attached to him. The female is about one-third less than the male, and differs from him considerably in colour; her tail is likewise much less forked. She makes an artless nest on the ground, where she lays six or eight eggs of a yellowish colour, with freckles and spots of a rusty brown. The young cocks at first resemble the mother, and do not acquire the male garb till towards the end of autumn, when the plumage gradually changes to a deeper colour, and assumes that of a bluish black.

The Ptarmigan.—The ptarmigan is a very wary bird, and therefore is generally pursued with the fowling piece, as it will seldom get into snares of any kind, at least land; the grouse is about half as large again as a partridge, and its colour much like that of a woodcock, but redder; the ptarmigan is still somewhat less, and is of a pale brown or ash colour. They are all distinguishable from other birds of the poultry kind, by a naked skin, of a scarlet colour, above the eyes, in the place, and of the figure, of eye-brows.

The cock of the wood, for it is from him we will take our description, is chiefly fond of a mountainous and wooded situation. In winter he resides in the darkest and inmost part of the woods; in summer he ventures down from his retreats, to make short depredations on the farmer's corn. The delicacy of his flesh in some measure sets a high price upon his head; and as he is greatly sought after, so he continues, when he comes down from the hills, always on his guard.

The cock of the wood, when in the forest, attaches himself principally to the oak and the pine-tree; the cones of the latter serving for his food, and the thick boughs for an habitation. He even makes a choice of what cones he shall feed upon; for he sometimes will strip one tree bare before he will deign to touch the cones of another. He feeds also upon ants' eggs, which seem a high delicacy to all birds of the poultry kind: cranberries are likewise often found in his crop: and his gizzard, like that of domestic fowls, contains a quantity of gravel, for the purposes of assisting his powers of digestion.

At the earliest return of spring, this bird begins to feel the genial influence of the season. During the month of March, the approaches of courtship are continued, and do not desist till the trees have all their leaves, and the forest is in full bloom. During this whole season, the cock of the wood is seen at sunrise, and sitting extremely active upon one of the largest branches of the pine tree. With his tail raised and expanded like a fan, and the wings drooping, he is seen walking backward and forward, his neck stretched out, his head swollen and red, and making a thousand ridiculous postures: his cry, upon that occasion, is a kind of loud explosion, which is instantly followed by a noise like the whetting of a scythe, which ceases and commences alternately for about an hour, and is then terminated by the same explosion.[*]

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so says Temminck; but Dr. Latham tells us that it is a "silly bird, suffering itself to be caught by any stratagem, however slight." Opposing statements of this sort are no novelty among natural historians. It would seem, however, to be no easy matter to procure this bird during the summer season, if we may judge by the comparatively few specimens of it, in the peculiar plumage of that time of the year, to be found in the cabinets of natural history. All attempts to hatch the ptarmigan in a domestic state have proved utterly fruitless. To say nothing of its wild nature, it is probable that the difference of the pure and elastic atmosphere, which it respires in its native mountains, from that of the plains and valleys, will always render any undertaking of this nature entirely abortive. In the season of reproduction, which commences about the end of May or beginning of June, the ptarmigans are seen in pairs; but in autumn many coveys unite and form bands more or less numerous. The flesh of the ptarmigan is good, and not unlike that of the hare in colour and flavour. In America, however, this is not the case. This bird more particularly inhabits the central Alps of Europe. It is also extended in North America.

[*] THE COCK OF THE PLAINS.—This bird, which was first mentioned by Lewis and Clark, has since become well known to the fur traders that frequent the banks of the Colombia. Several specimens have been sent to England by the agents of the Hudson's Bay Company. Mr. David Douglas has published the following account of the manners of the species, the only one hitherto given.

"The flight of these birds is slow, unsteady, and affords but little amusement to the sportsman. From the disproportionately small, convex, thin-quilled wing, so thin that a vacant space, half as broad as a quill appears between each, the flight may be said to be a sort of fluttering more than any thing else: the bird giving two or three claps of the wings in quick succession, at the same time hurriedly rising; then shooting or floating, swinging from side to side, gradually falling, and thus producing a clapping, whirring sound. When started, the voice is '*cuck, cuck, cuck*,' like the common pheasant. They pair in March and April. The love-song is a confined, grating, but not offensively disagreeable tone, something that we can imitate, but have a difficulty in expressing, '*Hurr-hurr—hurr-r-r-r hoo*,' ending in a

During the time this singular cry continues, the bird seems entirely deaf, and insensible of every danger: whatever noise may be made near him, or even though fired at, he still continues his call; and this is the time that sportsmen generally take to shoot him. Upon all other occasions, he is the most timorous and watchful bird in nature: but now he seems entirely absorbed by his instincts; and seldom leaves the place where he first begins to feel the accesses of desire. This extraordinary cry, which is accompanied by a clapping of the wings, is no sooner finished, than the female hearing it, replies, approaches, and places herself under the tree, from whence the cock descends to impregnate her. The number of females that, on this occasion, resort to his call, is uncertain; but one male generally suffices for all.

deep, hollow tone, not unlike the sound produced by blowing into a large reed. Nest on the ground, under the shade of *Purshia* and *Artemisia,* or near streams, among *Phalaris arundinacea,* carefully constructed of dry grass, and slender twigs. Eggs from thirteen to seventeen, about the size of those of a common fowl, of a wood-brown colour, with irregular chocolate blotches on the thick end. The young leave the nest a few hours after they are hatched. In the summer and autumn months these birds are seen in small troops, and in winter and spring in flocks of several hundreds. Plentiful through the barren arid plains of the river Colombia, also in the interior of North California. They do not exist on the banks of the river Missouri, nor have they been seen in any place east of the Rocky Mountains."

The general colour of the upper plumage is light hair-brown, mottled and variegated with dark umber-brown and yellowish white. The under plumage is white and unspotted on the breast and part of the body; but dark umber-brown approaching to black, on the lower half of the body and part of the flanks; the latter towards the vent are marked as on the upper plumage. The under tail coverts are black, broadly tipped with white. The feathers of the thighs and tarsi are light hair-brown, mottled with darker lines. The throat and region of the head is varied with blackish on a white ground. The shafts of all the feathers on the breast are black, rigid, and look like hairs; but those of the scale-like feathers of the sides are white and thicker. The bill and toes are blackish. The bill is thick and strong: the ridge is advanced to a remarkable extent towards the front, and divides the thickset feathers which cover the nostrils by a convex ridge of three-quarters of an inch long. This is a very peculiar and important character, since it plainly indicates the analogy of this form to *Ramphastos, Buceros,* and numerous other rasorial types. On each side the breast, the present, specimen exhibits two prominent, naked protuberances, as in the female bust, perfectly destitute of hair or feathers. On each side of these protuberances, and higher up on the neck, is a tuft of feathers, having their shafts considerably elongated and naked, gently curved, and tipped with a pencil of a few black radii; they are placed much behind the naked protuberances, and do not appear intended to cover them when not inflated. On the sides of the neck, and across the breast, below the protuberances, the feathers are particularly short, rigid, and acute, laying over each other with the same compactness and regularity as the scales of a fish, excepting that their extremities are not rounded, but acutely pointed. Lower down the breast these feathers, however, begin to assume more of the ordinary shape; but the shafts still remain very thick and rigid, while each is terminated by a slender, naked filament, hornlike, shining, and somewhat flattened towards the end, where there are a few obsolete radii. The wings in proportion to the size of the bird, are very short; the lesser quills ending in a point. The tail is rather lengthened, and considerably rounded, each feather lanceolate, and gradually attenuated to a fine point. The tarsi are somewhat elevated, thickly clothed with feathers to the base of the toes, and over the membrane which connects them. The length of this bird Mr. Swainson thinks to have been 25 inches. The female bird, it should be added, has neither the scale-like feathers, nor projecting shafts of the male.

LEGS AND FEET OF THE ROCKY MOUNTAIN SPOTTED GROUSE, (*Tetrao Franklinii,* DOUGLAS,) which are thickly covered with long and hair-like feathers. The bird inhabits the valleys of the Rocky Mountains from the sources of the Missouri to those of the Mackenzie; and Mr. Douglas informed Dr. Richardson that it is sparingly seen on the elevated platforms which skirt the snowy peaks of Mount Hood, Mount St. Helena, and Mount Baker. He adds, "It runs over the shattered rocks, and among the brushwood with amazing speed, and only uses its wings as a last effort to escape."

The CLAW is that of the PILEATED WOODPECKER, (Picus *Dryotomus*) *Pileatus,* SWAINSON, which has much less power than the claw of the typical woodpecker; the anterior toe (i. e. middle toe,) being longer and stronger than the posterior, a structure the very reverse of that which characterizes the typical species.—MIRROR, vol. XIX.

The female is much less than her mate, and entirely unlike him in plumage, so that she might be mistaken for a bird of another species: she seldom lays more than six or seven eggs, which are white, and marked with yellow, of the size of a common hen's egg; she generally lays them in a dry place and a mossy ground, and hatches them without the company of the cock. When she is obliged, during the time of incubation, to leave her eggs in quest of food, she covers them up so artfully with moss or dry leaves that it is extremely difficult to discover them. On this occasion, she is extremely tame and tranquil, however wild and timorous in ordinary. She often keeps to her nest, though strangers attempt to drag her away.

As soon as the young ones are hatched, they are seen running with extreme agility after the mother, though sometimes they are not entirely disengaged from the shell. The hen leads them forward, for the first time, into the woods, shows them ants' eggs and the wild mountain-berries, which, while young, are their only food.*

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* CAPERCALI.—The following account of the Cock of the Wood may prove interesting, as an attempt to naturalize this splendid bird is at present making in Scotland by the Earl of Fife:—"In the course of several short excursions that I made into the forest, towards the autumn, I shot a few capercali. This bird, as it is supposed, was an inhabitant of the British isles within the last century; and as it is not improbable that they will again be introduced, the few particulars I am now about to give regarding them may not be altogether uninteresting. The capercali is to be found in most parts of the Scandinavian peninsula; indeed, as far to the north as the pine tree flourishes, which is very near to the North Cape itself. The favourite haunts of the capercali are extensive fir woods: in coppices and small covers he is seldom or never to be found. Professor Nilsson observes that 'those which breed in the larger forests remain there all the year round; but those which, on the contrary, breed on the sides of elevated mountains, or in a more open part of the country, in the event of a deep snow, usually fall down to the lower grounds. The principal food of the capercali, when in a state of nature, consists of the leaves of the Scotch fir. He also eats juniper berries, cranberries, blueberries, and other berries common to the northern forests; and occasionally, also, in the winter time, the buds of the birch. The young birds feed at first on ants, worms, insects. The capercali hen makes her nest upon the ground, and lays from six to twelve eggs; it is said she sits for four weeks. Her young keep with her until the approach of winter; the cocks, however, separate from the mother before the hens. Excepting there be a deep snow, the capercali is much upon the ground in the day-time; very frequently, however, he sits on pines. During the night, according to Mr. Nilsson, he always roosts on trees. This, however, is not quite correct; for if the weather be very cold, he not unfrequently, as I myself have very many times witnessed, buries himself in the snow.

"The capercali lives to a considerable age—at least, so I infer from the cocks not attaining to their full growth until their third year or upward. The old ones may be easily known from their greater bulk, their eagle-like bill, and the more beautiful glossiness of their plumage. The size of these birds, I have reason to suppose, depends, in a great degree, on the latitude where they are found. In Lapland, for instance, the cocks seldom exceed nine or ten pounds. In the south of Sweden they have not unfrequently been met with, weighing seventeen pounds and upwards. The hen capercali usually weighs from five to six pounds. These birds occasionally breed with black game; the produce of which are called, in Sweden, *Rackelhanen*; these partake of the leading characteristics of both species. Their size and colour, however, greatly depend upon whether the connexion was between the capercali cock and the grey hen, or *vice versâ*. It is a pity that attempts are not made once more to introduce the capercali into the United Kingdom; for, if the experiment was undertaken with judgment, it would most probably be attended with success: the climate, soil, &c., in Scotland, at least, not being very dissimilar, in many respects, to the south of Sweden. In Scotland, besides, independently of the natural forests, there are now considerable tracts of land planted with pines, from which trees, when the ground is covered with snow, those birds obtain nearly the whole of their sustenance.

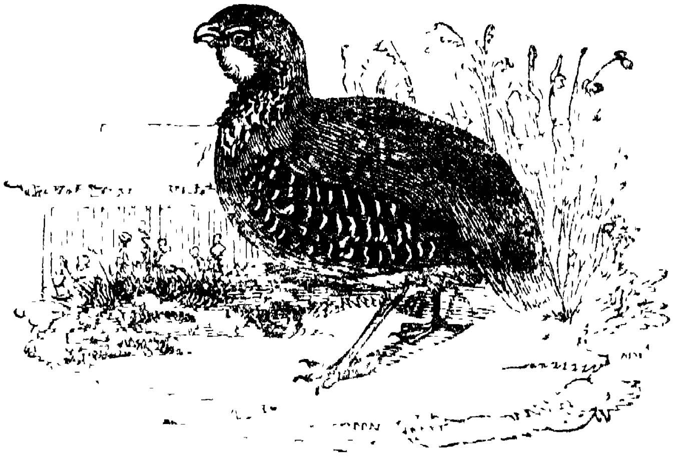
"It is true that, once in awhile, an odd brace of living capercali have been brought over to this country, though these have perished most likely from improper feeding. I recommended a larger importation some years ago to the present Duke of Gordon. His Grace, however, declined acting upon my suggestion on the ground of their being too little wood in the part of Scotland where his estates are situated.

"It has been asserted that the capercali will not breed in a state of domestication: this is a mistake. A few years ago, I pro-

CHAP. IX.

THE PARTRIDGE AND ITS VARIETIES.

The Partridge may be particularly considered as belonging to the sportsman. It is a bird which even our laws have taken under protection; and, like a peacock or a hen, may be ranked as a private property. The only difference now is, that we feed one in our farms, the other in our yards; that these are contented captives; those, servants that have it in their power to change their master by changing their habitation.


(The Partridge.)

Of partridges there are two kinds, the grey and the red. The red partridge is the largest of the two, and often perches upon trees; the grey, with which we are best acquainted in England, is most prolific and always keeps on the ground.*

The partridge seems to be a bird well known all over the world, as it is found in every country and in every climate; as well in the frozen regions about the pole as the torrid tracts under the equator. It even seems to adapt itself to the nature of the climate where it resides. In Greenland, the partridge which is

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cured a brace of those birds, consisting of a cock and hen, for a friend of mine in Norfolk. After the lapse of a few months, the hen laid six eggs, and from these six capercali were produced. The chicks attained a considerable size, but died, owing to the effects, as it was supposed, of a burning sun, to which they had been incautiously exposed."—Lloyd's Field Sports.

The pursuit of the capercali is a favourite amusement of the northern chasseurs during the winter season. Though their rifles most commonly carry a ball no larger than a pea, these men often make extraordinarily fine shots. It is an interesting sight to see in the distance a capercali brought down: one moment that noble bird is seen sitting on the pinnacle of a pine, and in the next, before one hears the report of the gun, he is tumbling headlong to the ground. Jan Finne, a celebrated hunter, whom Mr. Lloyd has frequent occasion to allude to, at an early period of life was in the habit of shooting great numbers of capercali. He once pursued the same pack for a fortnight. This consisted originally of twenty-six birds; but at the expiration of that time only one was left alive. The pack sometimes amount to a hundred. They are most commonly to be met with near to the margins of lakes, rivers, &c., where the birch usually grows in abundance.—Ed.

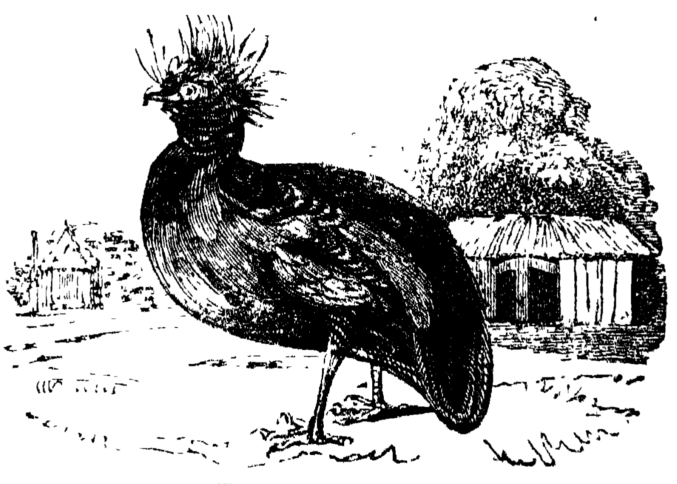
* **Greek Partridge.**—Modern ornithologists have ascertained many more varieties of partridges. The Greek partridge is more bulky than the red, with which it has frequently been confounded.

Red and Grey Partridges.—The grey partridge is generally met in this country;—the red-legged is to be found, though not in great numbers. They have been frequently introduced into England, yet, from the indifferent success which has generally resulted from the experiment, it would seem as if the soil or climate, or both, were not congenial to the constitution of that beautiful bird. The red is larger and more beautiful than the grey-legged partridge, but does not appear to afford such good diversion. The former is capricious in its movements; and, unlike the latter, will occasionally perch on trees and hedges.—Ed.

brown in summer, as soon as the icy winter sets in, begins to take a covering suited to the season: it is then clothed with a warm down beneath; and its outward plumage assumes the colour of the snows amongst which it seeks its food. Thus it is doubly fitted for the place by the warmth and the colour of its plumage; the one to defend it from the cold, the other to prevent its being noticed by the enemy. Those of Barakonda, on the other hand, are longer legged, much swifter of foot, and choose the highest rocks and precipices to reside in.

They all, however, agree in one character, of being immoderately addicted to venery; and, as some writers affirm, often to an unnatural degree. It is certain the male will pursue the hen even to her nest, and will break her eggs, rather than not indulge his inclinations.* Though the young ones have kept together in flocks during the winter, when they begin to pair in spring their society disperses; and combats, very terrible with respect to each other, ensue. Their manners, in other circumstances, resemble all those of poultry in general; but their cunning and instincts seem superior to those of the larger kinds. Perhaps, as they live in the very neighbourhood of their enemies, they have more frequent occasion to put their little arts in practice; and learn, by habit, the means of evasion or safety.

There are several methods of taking them, as is well known: that by which they are taken in a net, with a setting dog, is the most pleasant, as well as the most secure. The dog, as everybody knows, is trained to this exercise by a long course of education: by blows and caresses he is taught to lie down at the word of command; a partridge is shown him, and he is then ordered to lie down; he is brought into the field, and when the sportsman perceives where the covey lies, he orders his dog to crouch: at length the dog, from habit, crouches wherever he approaches a covey; and this is the signal which the sportsman receives for unfolding and covering the birds with his net. A covey thus caught is sometimes fed in a place proper for their reception; but they can never be thoroughly tamed, like the rest of our domestic poultry.†



(The Crested Partridge.)

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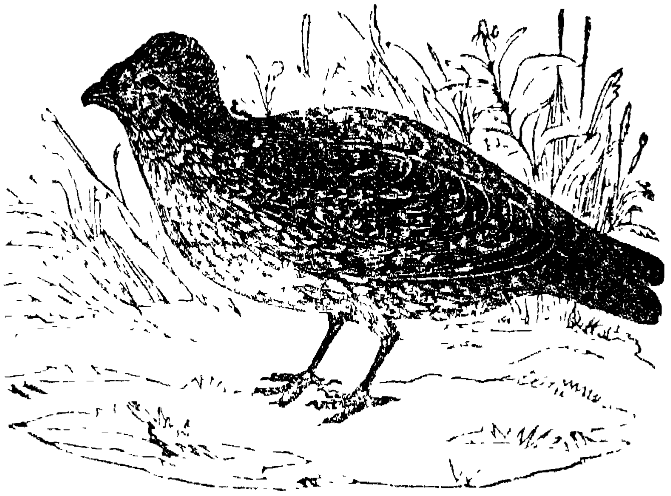
* FECUNDITY.—There are instances on record of the fecundity of the partridge, quite astonishing. In the year 1793, on a farm near Terlington, in Essex, the nest of a partridge was found in a fallow field, containing thirty-three eggs, twenty-three of which were hatched, and four more had live birds in them. In 1801, at Walton Place, Northamptonshire, a nest of the same bird was found, containing the like number of eggs. This generally happens when the season is fine and dry. White, in his Selborne, remarks, "that after the *dry* summer of 1740-1, partridges swarmed to such a degree that unreasonable sportsmen killed twenty, and sometimes thirty, brace a day." Dry weather cannot be otherwise than favourable; as the shells of the eggs are porous, if they happen to imbibe moisture, the principle of life must perish. Partridge-shooting may be ranked in the next degree to grouse-shooting; and those who feel an aversion to climbing heathy mountains, and walking with wet feet, will of course prefer it. This bird was originally taken by the net.

† GAME LAWS.—This is one of the few birds known under the denomination of game, and protected by the legislature. But notwithstanding many severe penal laws are enacted for its preservation, it is a query if the breed is not decreased thereby. The great demand of the luxurious and wealthy, and the high price given for these birds, are too great temptations to the poacher; and he risks his liberty to supply the table of the rich. Thus the several laws respecting game are ineffectual: they only serve to enhance the price, and hold out a tempta-

CHAP. X.

THE QUAIL.



(The Quail)

The last of the poultry kind that I shall mention is the QUAIL; a bird much smaller than any of the former, being not above half the size of a partridge. The feathers of the head are black, edged with rusty brown; the breast is of a pale yellowish red, spotted with black; the feathers on the back are marked with lines of pale yellow, and the legs are of a pale hue. Except in the colours thus described, and the size, it every way resembles a partridge in shape; and except that it is a bird of passage, all others of the poultry kind in its habits and nature.

The quail is by all known to be a bird of passage; and yet if we consider its heavy manner of flying and its dearth of plumage, with respect to its corpulence, we shall be surprised how a bird so apparently ill qualified for migration, should

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tion for the husbandman to ruin himself and family; whereas if the penalty was made much greater, and that wholly confined to the buyer, it would fall upon the tempters, who should be the only persons obliged by law to pay for their luxuries. The late Act of Parliament, for confining the killing of this species between the 14th of September and the 12th of February, only tended, in some degree, to preserve them from the fowler, but not from the nets of the poacher.—Ed.

* The Quail is found in most parts of Great Britain, but no where in great quantity. The time of their migration from this country is August or September: they are supposed to winter in Africa, and they return early in the spring. At their arrival in Alexandria, such multitudes are exposed in the markets for sale, that three or four may be bought for a medina, a coin less than three farthings in value. Crews of merchant vessels have been fed upon them; and complaints have sometimes been laid at the consul's office, by mariners against their captains, for giving them nothing but quails to eat. With wind and weather in their favour, they have been known to perform a flight of fifty leagues across the Black Sea in the course of a night—a wonderful distance for so short-winged a bird. Such prodigious quantities have appeared on the western coast of the kingdom of Naples, in the vicinity of Natuno, that a hundred thousand have, in one day, been caught within the space of three or four miles. Most of them are taken to Rome, where they are in great request, and are sold at high prices. In some parts of the south of Russia, they abound so greatly that, at the time of their migration, they are caught by thousands, and sent in casks to Moscow and Petersburgh.

With respect to these birds having a distinct knowledge of the precise time for emigration, we have a very singular fact in some young quails which, having been bred in cages from the earliest part of their lives, had never enjoyed, and therefore could not feel, the loss of liberty. For four successive years they were observed to be restless, and to flutter with unusual agitation regularly in September and April, and this uneasiness lasted thirty days each time. It began constantly an hour after sunset. The birds passed the whole night in these fruitless struggles, and always, on the following day, appeared dejected and stupid. There are twenty-three species of quails.

take such extensive journeys. Nothing, however, is more certain. "When we sailed from Rhodes to Alexandria," says Bellonius, "about autumn, many quails, flying from the north to the south, were taken in our ship; and sailing at spring-time the contrary way, from the south to the north, I observed them on their return, when many of them were taken in the same manner." This account is confirmed by many others, who aver that they choose a north wind for these adventures, the south wind being very unfavourable, as it retards their flight by moistening their plumage. They then fly two by two; continuing, when their way lies over land, to go faster by night than by day; and to fly very high, to avoid being surprised or set upon by birds of prey.

These birds are much less prolific than the partridge, seldom laying more than six or seven whitish eggs, marked with ragged, rust-coloured spots. But their ardour in courtship yields scarce to any other bird, as they are fierce and cruel at that season to each other, fighting most desperately, and (a punishment they richly deserve) being at that time very easily taken.

Quails are easily caught by a call: the fowler, early in the morning, having spread his net, hides himself under it, among the corn; he then imitates the voice of the female with his quailpipe, which the cock hearing, approaches with the utmost assiduity; when he has got under the net, the fowler then discovers himself, and terrifies the quail, who, attempting to get away, entangles himself the more in the net, and is taken. The quail may thus very well serve to illustrate the old adage, that every passion, carried to an inordinate excess, will at last lead to ruin.*

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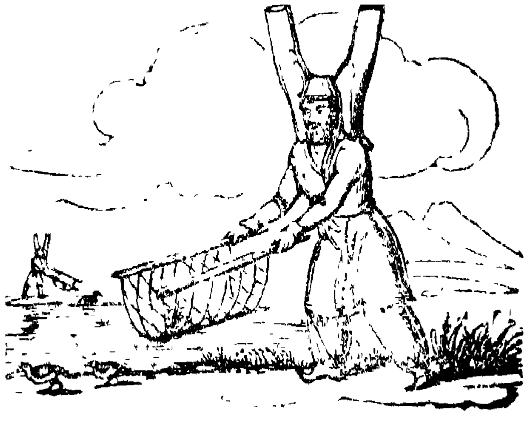
* THE QUAIL IN CANADA.—About thirty years ago, this bird was unknown in Canada. It abounds in the Upper Province but has not yet appeared in the Lower. Its habits appear remarkable, although probably not more so than those of any other wild fowl, when carefully watched. A gentleman, of much patient research in regard to wild animals, who has been a resident in Upper Canada since the quails first made their appearance, happened to have above a hundred at one period alive, and took much pleasure in the evening watching their motions where they were confined. As it grew dusk, the birds formed themselves into coveys or parties of twelve or fifteen in a circle, the heads out, and tails clustered in the centre. One bird always stood on guard to each party, and remained perfectly stationary for half an hour, when a particular *chuck* being given, another sentinel immediately took his place, and relieved him with as much regularity as any garrison could boast. It became a matter of further curiosity to observe how they would meet the extra duty occasioned by the havoc of the cook. For this also a remedy was found; and the gentleman remarked, with admiration, that, as their number decreased, the period of watch was extended from a half to a whole hour, in the same form, and with unfailing regularity. [The quail here mentioned is supposed to be the Virginian Partridge, *Perdix virginiana*, the quail of Europe, *Perdix coturnix*, not being indigenous in any part of America.—EDIT.]—ARCANA OF SCIENCE, 1832.

Catching quails is a very curious but successful pursuit. Mr Morier says:—"They stick two poles in their girdle, upon which they place either their outer coat, or a pair of trousers, and these, at a distance, are intended to look like the horns of an animal. They then with a hand-net prowl about the fields, and the quail seeing a form, more like a beast than a man, permits it to approach so near as to allow the hunter to throw his net over it. The rapidity with which the Persians caught quails in this manner was astonishing, and we had daily brought to us cages full of them, which we bought for a trifle. In one of my rambles with a gun, I met a shepherd boy, who, laughing at the few birds I had killed, immediately erected his horns, and soon caught more alive than I had killed."—MIRROR, vol. xxii.



(Catching Quails.)

CHAP. I.

BIRDS OF THE PIE KIND.

In marshalling our army of the feathered creation, we have placed in the van a race of birds long bred to war, and whose passion is slaughter; in the centre we have placed the slow and heavy laden, that are usually brought into the field to be destroyed; we now come to a kind of light infantry, that partake something of the spirit of the two former, and yet belonging to neither. In this class we must be content to marshal a numerous irregular tribe, variously armed, with different pursuits, appetites, and manners; not formidably formed for war, and yet generally delighting in mischief; not slowly and usefully obedient, and yet without any professed enmity to the rest of their fellow-tenants of air.

To speak without metaphor, under this class of birds we may arrange all that noisy, restless, chattering, teasing tribe, that lies between the hen and the thrush, that, from the size of the raven down to that of the woodpecker, flutter round our habitations, and, rather with the spirit of pilferers than of robbers, make free with the fruits of human industry.

Of all the other classes, this seems to be that which the least contributes to furnish out the pleasure or supply the necessities of man. The falcon hunts for him; the poultry tribe supplies him with luxurious food; and the little sparrow race delight him with the melody of their warblings. The crane kind make a studied variety in his entertainments; and the class of ducks are not only many of them delicate in their flesh, but extremely useful for their feathers. But in the class of the pie kind there are few except the pigeon that are any way useful. They serve rather to tease man than to assist or amuse him. Like faithless servants, they are fond of his neighbourhood, because they mostly live by his labour; but their chief study is what they can plunder in his absence, while their deaths make him no atonement for their depredation.

But though, with respect to man, this whole class is rather noxious than beneficial—though he may consider them in this light as false, noisy, troublesome neighbours, yet, with respect to each other, no class of birds are so ingenious, so active, or so well fitted for society. Could we suppose a kind of morality among birds, we should find that those are by far the most industrious, the most faithful, the most constant, and the most connubial. The rapacious kinds drive out their young before they are fit to struggle with adversity, but the pie kind cherish their young to the last. The poultry class are faithless and promiscuous in their courtship; but these live in pairs, and their attachments are wholly confined to each other. The sparrow kind frequently overleap the bounds of nature, and make illicit varieties, but these never. They live in harmony with each other; every species is true to its kind, and transmits an unpolluted race to posterity.

As other kinds build in rocks or upon the ground, the chief place where these build is in trees or bushes; the male takes his share in the labours of building the nest; and often relieves his mate in the duties of incubation. Both take this office by turns; and when the young are excluded, both are equally active in making them an ample provision.

They sometimes live in societies; and in these there are general laws observed, and a kind of republican form of government established among them. They watch not only for the general safety, but for that of every other bird of the grove. How often have we seen a fowler, stealing in upon a flock of ducks or wild geese, disturbed by the alarming note of a crow or a magpie: its single voice gave the whole thoughtless tribe warning, and taught them in good time to look to their safety.*

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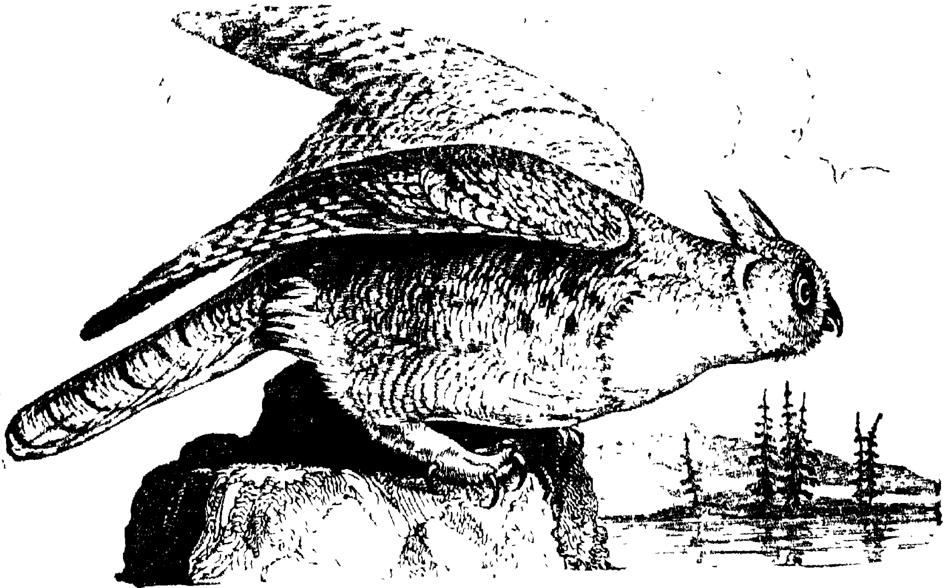
* Decoy Tricks.—Of the many remarkable phenomena exhibited by birds, there is none more interesting than the courage which they display in the defence of their young,

TH[illegible] WASHINGTON



THE WHITE HORNED OWL. Page 88

Nor are these birds less remarkable for their instincts than their capacity for instruction. There is an apparent cunning or archness in the look of the whole tribe; and I have seen crows and ravens taught to fetch and carry with the docility of a spaniel. Indeed, it is often an exercise that, without teaching, all this tribe are but too fond of. Everybody knows what a passion they have for shining substances and such toys as some of us put a value upon. A whole family has been alarmed at the loss of a ring: every servant has been accused, and every creature in the house, conscious of their own innocence, suspected each other, when, to the utter surprise of all, it has been found in the nest of a tame magpie or a jackdaw that nobody had ever thought of.

However, as this class is very numerous, it is not to be supposed that the manners are alike in all. Some, such as the pigeon, are gentle and serviceable to man; others are noxious, capricious, and noisy. In a few general characters they all agree; namely, in having hoarse voices, slight, active bodies, and a facility of flight that baffles even the boldest of the rapacious kinds in the pursuit. I will begin with those birds which most properly may be said to belong to this class, and go on till I finish with the pigeon—a harmless bird, that resembles this tribe in little else except their size, and that seems to be the shade uniting the pie and the sparrow kind into one general picture.

It is not to be expected that in this sketch of the great magazine of Nature we can stop singly to contemplate every object. To describe the number that offers would be tedious, and the similitude that one bears another would make the history disgusting. As an historian in relating the actions of some noble people does not stop to give the character of every private man in the army, but only of such as have been distinguished by their conduct, courage, or treachery, so should the historian of Nature only seize upon the most striking objects before him; and, having given one common account of the most remarkable, refer the peculiarities of the rest to their general description.

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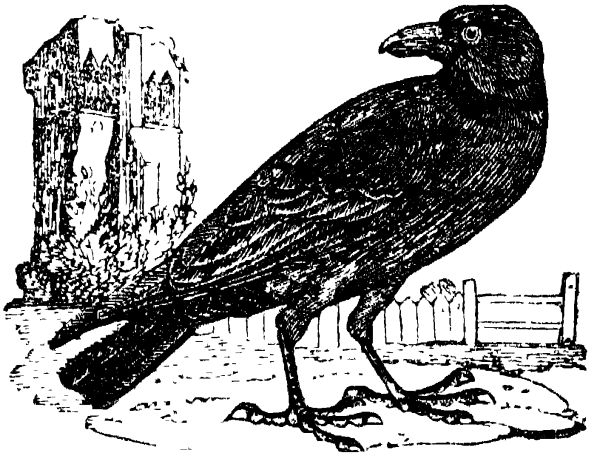
or, in the absence of power adequate to the occasion, the cunning which they employ in decoying the aggressor. Some instances of this, in our native birds, may be worth recounting. The eagle, it might be supposed, being the strongest of our birds, would successfully defend his nest against the attacks of every other species; and so he does, partly, however, for this reason, that very few hostile birds ever approach him in his haunts. Of quadrupeds, there are none that could venture to approach, excepting the wild cat and the marten. Man is the only formidable antagonist of the eagle, but against man the eagle hardly ever ventures to aim a blow. In the island of Lewes, in Scotland, a woman, descending a ridge of rocks on which there was an eagle's nest, was, some years ago, attacked by these birds, and hardly escaped with her life. But, on the other hand, shepherds frequently approach these nests, yet the birds offer no molestation than by screaming and showing their huge talons. Hardly any bird attacks man in such circumstances, and those which do, are too insignificant to inflict any injury. Many birds building in cliffs, trees, and towers, are in a great measure out of the reach of man, and, therefore, manifest little anxiety when he prowls about their habitations; but many, also, deposit their eggs on the ground, and have more occasion to dread their destroyer. Of those who have recourse to stratagem, perhaps no species exhibits it more curiously than the ring-dotterel, the lapwing, and the golden plover. The dotterel deposits its eggs in a superficial cavity in the sand, a little above water-mark, without any nest, the young running off the moment they are hatched. When a person approaches, the birds are seen flying up to him, emitting their peculiar cry. They begin to run about with great celerity, stopping every now and then. If it is pursued, it runs along without flying off. By a succession of short runs and flights, it lures its pursuer a great distance, and then makes off, whistling joyfully, as if in exultation at the *ruse*. The partridge and other gallinaceous birds play off similar tricks; but the birds by which they are best performed are the small species of grallæ, such as snipes, dunlins, &c. The small singing birds, whose nests are exposed, as the lark, tom-tit, &c., do not attempt to deceive the aggressor; but why they lack the instinct is not easy to be discovered.—ED.

CHAP II.

THE RAVEN, THE CROW, AND THEIR AFFINITIES.



(The Raven.)

The Raven, the **Carrion-Crow**, and the **Rook**, are birds so well known that a long description would but obscure our ideas of them. The raven is the largest of the three, and distinguished from the rest, not only by his size, but by his bill being somewhat more hooked than that of the rest. As for the carrion-crow and the rook, they so strongly resemble each other both in make and size that they are not easily distinguished asunder. The manners, also, of the raven and the carrion-crow are exactly similar; they both feed upon carrion; they fly only in pairs; and will destroy other birds, if they can take them by surprise. But it is very different with the rook, the daw, and the Cornish chough, which may be all ranked in this order. They are sociable and harmless; they live only upon insects and grain; and wherever they are, instead of injuring other birds, they seem sentinels for the whole feathered creation. It will be proper, therefore, to describe these two sorts according to their respective appetites, as they have nothing in common but the very strong similitude they bear to each other in their colour and formation.

The raven is a bird found in every region of the world; strong and hardy, he is uninfluenced by the changes of the weather; and when other birds seem numbed with cold, or pining with famine, the raven is active and healthy, busily employed in prowling for prey, or sporting in the coldest atmosphere. As the heats at the line do not oppress him, so he bears the cold of the polar countries with equal indifference. He is sometimes, indeed, seen milk white, and this may probably be the effect of the rigorous climates of the north. It is most likely that this change is wrought upon him, as upon most other animals in that part of the world, where their robes, particularly in winter, assume the colour of the country they inhabit.

A raven may be reclaimed to almost every purpose to which birds can be converted. He may be trained up for fowling like a hawk; he may be taught to fetch and carry like a spaniel; he may be taught to speak like a parrot; but the most extraordinary of all is, that he can be taught to sing like a man. I have heard a raven sing the Black Joke with great distinctness, truth, and humour.*

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* Anecdotes.—At the seat of the Earl of Aylesbury, in Wiltshire, a tame raven, that had been taught to speak, used to ramble about in the park; there he was commonly attended and beset with crows, rooks, and others of his inquisitive tribe. When a considerable number of these were collected round him, he would lift up his head, and with a hoarse and hollow voice shout out the word "Holloa!" This would instantly put to flight and disperse his sable brethren, while the raven seemed to enjoy the fright he had occasioned.

In the year 1785, a gentleman going into

Indeed, when the raven is taken as a domestic, he has many qualities that render him extremely amusing Busy, inquisitive, and impudent, he goes everywhere, affronts and drives off the dogs, plays his pranks on the poultry, and is particularly assiduous in cultivating the good will of the cook-maid, who seems to be the favourite of the family. But then, with the amusing qualities of a favourite, he often also has the vices and defects. He is a glutton by nature and a thief by habit. He does not confine himself to petty depredations on the pantry or the larder; he soars at more magnificent plunder; at spoils that he can neither exhibit nor enjoy: but which, like a miser, he rests satisfied with having the satisfaction of sometimes visiting and contemplating in secret. A piece of money, a tea-spoon, or a ring, are always tempting baits to his avarice; these he will slily seize upon, and if not watched will carry to his favourite hole.

In his wild state, the raven is an active and greedy plunderer. Nothing comes amiss to him: whether his prey be living or long dead it is all the same; he falls to with a voracious appetite, and when he has gorged himself, flies to acquaint his fellows that they may participate of the spoil. If the carcass be already in the possession of some more powerful animal, a wolf, a fox, or a dog, the raven sits at a little distance, content to continue a humble spectator till they have done. If in his flights he perceives no hopes of carrion—and his scent is so exquisite that he can smell it at a vast distance—he then contents himself with more unsavoury food, fruits, insects, and the accidental desert of a dunghill

This bird chiefly builds its nest in trees, and lays five or six eggs of a pale green colour, marked with small brownish spots. They live sometimes in pairs, and sometimes they frequent, in great numbers, the neighbourhood of populous cities, where they are useful in devouring those carcasses that would otherwise putrify and infect the air. They build in high trees or old towers, in the beginning of March with us in England, and sometimes sooner, as the spring is more or less advanced for the season. But it is not always near towns that they fix their retreats: they often build in unfrequented places, and drive all other birds from their vicinity.

Birds in general live longer than quadrupeds; and the raven is said to be one of the most long lived of the number. Hesiod asserts that a raven will live nine times as long as a man; but though this is fabulous, it is certain that some of them have been known to live near a hundred years. This animal seems possessed of those qualities that generally produce longevity—a good appetite and great exercise. In clear weather, the ravens fly in pairs to a great height, making a deep, loud noise, different from that of their usual croaking.

The carrion-crow resembles the raven in its appetites, its laying, and manner of bringing up its young. It only differs in being less bold, less docile, and less favoure'd by mankind.

The rook leads the way in another, but a more harmless train, that have no carnivorous appetites, but only feed upon insects and corn.[*] The Royston

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the Red Lion Inn, at Hungerford, his chaise ran over and sorely bruised the leg of his Newfoundland dog Whilst examining the injury and bathing the wound, a raven, which belonged to the people of the house, attended, and was apparently a much concerned spectator. The dog's leg being dressed, he was tied up in the manger, where Ralph not only immediately visited him, but brought him bones, and attended him with repeated marks of attention. The bird's notice of the dog was so very extraordinary that the gentleman questioned the ostler concerning the affair; who informed him that the raven had been bred from his pin-feather in intimacy with a dog, and that the affection was mutual—Ralph's poor dog, by some accident, had also got his leg broken; and during the long time he was confined, his friend waited upon him, constantly carrying him provisions, and scarcely ever quitting him.

One night, by accident, the ostler had shut the stable door, and Ralph was deprived of the company of his friend the whole night; but the ostler found, in the morning, the bottom of the door so pecked that, had it not been opened, Ralph would in another hour have made himself an entrance.

Antipathy —" Gesner has called the common rook (*Corvis frugilegus*) a corn-eating bird Linnæus has somewhat lightened this epithet by considering it only as a gatherer of corn: to neither of which names do I believe it entitled, as it appears to live solely upon grubs, various insects, and crow is about the size of the two former. The breast, belly, back, and upper part of the neck, being of a pale ash-colour; the head and wings glossed over with a fine blue. He is a bird of passage, visiting this kingdom in the beginning of winter and leaving it in the spring. He breeds, however, in different parts of the British dominions; and his nest is common enough in trees in Ireland. The jackdaw is black, like all the former, but ash-coloured on the breast and belly. He is not above the size of a pigeon. He is docile and loquacious: his head being large for the size of his body, which, as has been remarked, argues him ingenious and crafty. He builds in steeples, old castles, and high rocks, laying five or six eggs in a season. The Cornish chough is like a jackdaw, but bigger, and almost the size of a crow. The feet and legs are long, like those of a jackdaw, but of a red colour, and the plumage is black all over. It frequents rocks, old castles, and churches, by the sea-side, like the daw, and with the same noisy assiduity. It is only seen along the western coasts of England. These are birds very similar in their manners, feeding on grain and insects, living in society, and often suffering general castigation from the flock for the good of the community.

The rook, as is well known, builds in woods and forests in the neighbourhood of man, and sometimes makes choice of groves in the very midst of cities for the place of its retreat and security. In these it establishes a kind of legal consti-

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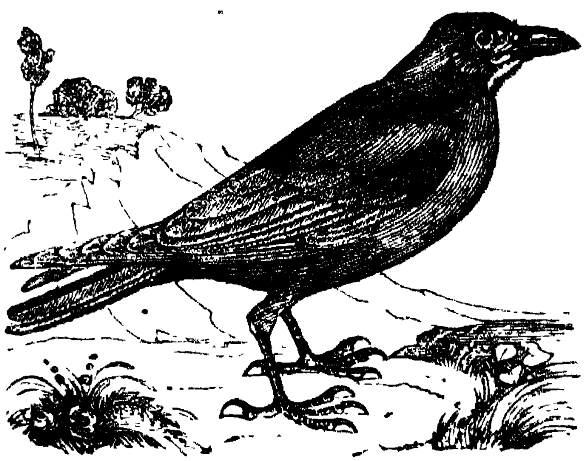
worms. It has at times considerable difficulty to support its life; for in a dry spring or summer most of these are hidden in the earth beyond its reach, except at those uncertain periods when the grub of the chaffer is to be found; and in a hot day we see the poor birds perambulating the fields, and wandering by the sides of the highways, seeking for and feeding upon grasshoppers, or any casual nourishment that may be found At those times, was it not for its breakfast of dew-worms, which it catches in the grey of the morning, as it is appointed the earliest of risers, it would commonly be famished. In the hot summer of 1825, many of the young brood of the season perished from want; the mornings were without dew, and consequently few or no worms were to be obtained, and we found them dead under the trees, having expired on their roostings. It was particularly distressing, for no relief could be given, to hear the constant clamour and importunity of the young for food. The old birds seemed to suffer without complaint; but the wants of their offspring were expressed by the unceasing cry of hunger, and pursuit of their parents for supply, and our fields were scenes of daily restlessness and lament. Yet amid all this distress, it was pleasing to observe the perseverance of the old birds in the endeavour to relieve their famishing families, as many of them remained out searching for food quite in the dusk, and returning to their nests long after the usual period of retiring. In this extremity it becomes a plunderer, to which, by inclination, it is not much addicted, and resorts to our newly-set potato fields, digging out the cuttings. Ranks are seen sadly defective, the result of its labours, I fear; and the request of my neighbours now and then for a bird from my rookery to hang up *in terrorem* in their fields, is confirmatory of its bad name In autumn, a ripe pear or a walnut becomes an irresistible temptation, and it will occasionally obtain a good share of these fruits. In hard frost it is pinched again, visits for food the banks of streams, and, in conjunction with its congener, the 'villain crow,' becomes a wayfaring bird, and 'seeks a dole from every passing steed.' It is but simple justice to these often-censured birds to mention the service that they at times perform for us in our pasture lands. There is no plant that I endeavour to root out with more persistency in these places than the tufty hair-grass (*Aira cæspitosa*) It abounds in all the colder parts of our grass lands, increasing greatly when undisturbed, and worthless itself, overpowers its more valuable neighbours. The larger turfs are pretty well got rid of; but multitudes of small roots are so interwoven with the pasture herbage that we cannot separate them without injury, and these our persevering rooks stock up for us in such quantities, that in some seasons the fields are strewed with the eradicated plants. The whole so torn up does not exclusively prove to be the hair, but infinitely the larger portion consists of this injurious plant The object of the bird in performing this service for us, is to obtain the larvæ of several species of insects, underground feeders, that prey on the roots, as Linnæus long ago observed upon the subject of the little nard grass (*Nardus stricta*). This benefit is partly a joint operation: the grub eats the root, but not often so effectually as to destroy the plant, which easily roots itself anew; but the rook finishes the affair by pulling it up to get at the larvæ, and thus prevents all vegetation; nor do I believe that the bird ever removes a specimen that has not already been eaten, or commenced upon, by the caterpillar."—JOURNAL OF A NATURALIST.

tution, by which all intruders are excluded from coming to live among them, and none suffered to build but acknowledged natives of the place. I have often amused myself with observing their plan of policy from my window in the Temple, that looks upon a grove where they have made a colony in the midst of the city. At the commencement of spring, the rookery, which during the continuance of winter seemed to have been deserted, or only guarded by about five or six, like old soldiers in a garrison, now begins to be once more frequented, and in a short time all the bustle and hurry of business is fairly commenced. Where these numbers resided during the winter is not easy to guess; perhaps in the trees of hedgerows, to be nearer their food. In spring, however, they cultivate their native trees; and, in the places where they were themselves hatched, they prepare to propagate a future progeny.*



(The Rook.)

* **Rooks.**—Rooks appear to have a language amongst themselves, which is understood by the whole community; and a peculiar note from a bird set to watch and to warn them of approaching danger, is quite sufficient to make them take flight, and always in an opposite direction to that from which the danger is apprehended.

There is one trait in the character of the rook, which is peculiar to that bird, and does him no little credit; it is the distress which they exhibit when one of them has been killed or wounded by a gun. They continue to hover round, or sometimes making a dart from the air close up to him, apparently try to find out the reason why he does not follow them:—

> "While circling round and round,
> They call their lifeless comrade from the ground."

When one considers the instinctive care with which rooks avoid any one carrying a gun, and which is so evident, that I have often heard country people remark that they can smell gunpowder, it is surprising: that it is the instrument, and not the man, which they avoid, is evident from their following the heels of the peaceable ploughman along the furrow.—JESSE'S GLEANINGS.

Stratagem.—Wilson, in his American Ornithology, says that crows have been employed to catch crows by the following stratagem:—A live crow is pinned by the wings down to the ground, on his back, by means of two sharp forked sticks. Thus situated, his cries are loud and incessant, particularly if any crows are in view. These, sweeping down about him, are instantly grappled and held fast by the prostrate prisoner, with the same instinctive impulse that urges a drowning person to grasp at everything within his reach. The game being disengaged from his clutches, the trap is again ready for another experiment.]

Rookery Statistics.—The average number of rooks' nests, during the last four years, in the avenue of Hampton Court Park, has been 750. Allowing three young birds and a pair of old ones to each nest, the numbers would amount to 3,750. They are very particular that none of their society build away from the usual line of trees. A pair of rooks did so this spring (1832), and when their nest was nearly finished, at least fifty others came and demolished it in a few minutes.

Crows sometimes choose odd places to build in, and where we should hardly have expected to find the nest of a bird of social habits. Dr Mitchell says that a few years ago a pair of crows built their nest between the wings of the dragon of Bow Church, in London. They remained there till the steeple required repairs. Another pair built their nest on the top of the large plane-tree in Wood-street, Cheapside. A few seasons ago, a hawk built its nest under the dome of St. Paul's. Another of the falcon tribe had its nest, a few years ago, in the top of the steeple of Spitalfields-church. Some years ago, Hone informs us in his *Every Day Book*, there were several large elm trees in the college garden behind the Ecclesiastical Court, in Doctors' Commons, in which a number of rooks had taken up their abode, forming, in appearance, a sort of *convocation* of aerial ecclesiastics. A young gentleman who lodged in an attic, and was their close neighbour, frequently entertained himself with thinning this covey of black game by means of a cross-bow. On the opposite side

They keep together in pairs; and when the offices of courtship are over, they prepare for making their nests and laying. The old inhabitants of the place are all already provided: the nest which served them for years before, with a little trimming and dressing will serve very well again; the difficulty of nestling lies only upon the young ones who have no nest, and must, therefore, get up one as well as they can. But not only the materials are wanting, but also the place in which to fix it. Every part of a tree will not do for this purpose, as some branches may not be sufficiently forked; others may not be sufficiently strong; and still others may be too much exposed to the rockings of the wind. The male and female upon this occasion are, for some days, seen examining all the trees of the grove very attentively; and, when they have fixed upon a branch that seems fit for their purpose, they continue to sit upon and observe it very sedulously for two or three days longer. The place being thus determined upon, they begin to gather the materials for their nest; such as sticks and fibrous roots, which they regularly dispose in the most substantial manner. But here a new and most unexpected obstacle arises. It often happens that the young couple have made choice of a place too near the mansion of an older pair, who do not choose to be incommoded by such troublesome neighbours. A quarrel, therefore, instantly ensues, in which the old ones are always victorious.

The young couple, thus expelled, are obliged again to go through the fatigues of deliberating, examining, and choosing; and having taken care to keep their due distance, the nest begins again, and their industry deserves commendation. But their alacrity is often too great in the beginning: they soon grow weary of bringing the materials of their nest from distant places; and they very easily perceive that sticks may be provided nearer home, with less honesty indeed, but some degree of address. Away they go, therefore, to pilfer as fast as they can; and wherever they see a nest unguarded, they take care to rob it of the very choicest sticks of which it is composed. But these thefts never go unpunished; and, probably, upon complaint being made there is a general punishment inflicted. I have seen eight or ten rooks come upon such occasions, and, setting upon the new nest of the young couple all at once, tear it in pieces in a moment.

In some countries these birds are considered as a benefit, in others as a nuisance: their chief food is the worm of the dorbeetle and corn; thus they may be said to do as much service by destroying that noxious insect, as they do injury by consuming the produce of the husbandman's industry.

To this tribe of the crow kind some foreign sorts might be added: I will take notice only of one, which, from the extraordinary size and fashion of its bill, must not be passed in silence.* This is the Calao, or horned Indian raven,

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lived a curious old civilian, who, observing from his study that the rooks often dropped senseless from their perch, or as it may be said without a figure, *hopp'd the twig*, set his wits to work to discover the cause. It was probably during a profitless time of peace, and the doctor having plenty of leisure, weighed the matter over and over, till he was at length satisfied that he had made a great ornithological discovery, that its promulgation would give wings to his fame, and that he was fated by means of these rooks to say

"Volito vivus per ora virum."

His goose-quill and foolscap were quickly in requisition, and he actually wrote a treatise, stating circumstantially what he had seen, and, in conclusion, giving it as the settled conviction of his mind, that rooks were subject to the *falling sickness*.—EVERY DAY BOOK.

* AMERICAN CROWS.—The *vultur atratus*, or carrion-crow of America, differs materially from the bird so common in England. It is thus described by Mr. Audubon:—

In the cities where they are protected they enter the very kitchen, and feed on whatever is thrown to them, even on vegetables. If unmolested, they will remain on the same premises for months, flying to the roof at dusk to spend the night. Six or seven are often seen standing in cold weather round the funnel of a chimney, apparently enjoying the heat from the smoke.

Notwithstanding the penalties imposed by law, a number of those birds are destroyed on account of their audacious pilfering. They seize young pigs as great dainties. They watch the cackling hen in order to get the fresh egg from her nest; and they will not hesitate to swallow a brood of young ducks. In order to keep them from the roofs of houses, where their dung is detrimental, the inhabitants guard the top with broken pieces of glass fastened in mortar, and they often which exceeds the common raven in size and habits of depredation. But what he differs in from all other birds is the beak, which, by its length and curvature at the end, appears designed for rapine; but then it has a kind of horn standing out from the top, which looks somewhat like a second bill, and gives this bird, otherwise fierce and ugly, a very formidable appearance. The horn springs out of the forehead, and grows to the upper part of the bill, being of great bulk; so that near the forehead it is four inches broad, not unlike the horn of the rhinoceros, but more crooked at the tip. Were the body of the bird answerable in size to the head, the calao would exceed in magnitude even the vulture or the eagle. But the head and beak are out of all proportion, the body being not much larger than that of a hen. Yet even here there are varieties; for in such of those birds as come from different parts of Africa the body is proportionable to the beak; in such as come from the Molucca Islands, the beak bears no proportion to the body. Of what use this extraordinary excrescence is to the bird is not easy to determine: it lives, like others of its kind, upon carrion, and seldom has a living enemy to cope with. Nature seems to sport in the production of many animals, as if she were willing to exhibit instances as well of variety as economy in their formation.*

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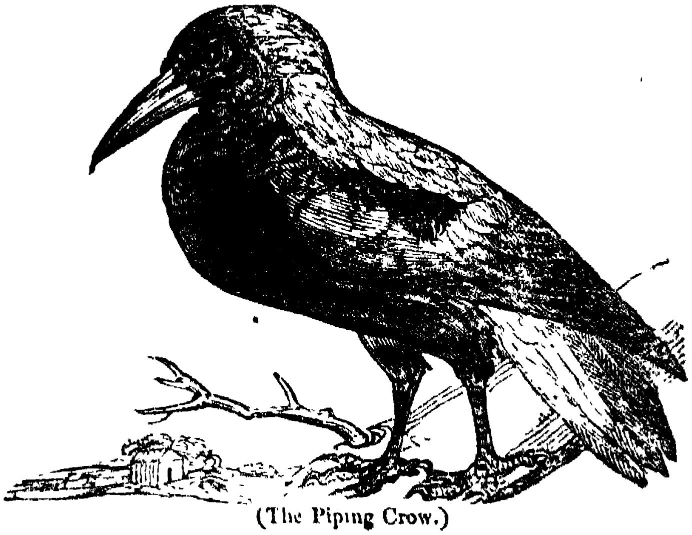
kill them by throwing boiling water upon them. No fewer than two hundred of these birds are daily fed by the city of Natchez.

Like all other cowards, these birds only fight violently when urged on by hunger or imminent danger, gradually augmenting to a high pitch; but then they make amends by beating their conquered adversary to death if in their power. When busily engaged with a dead carcass, they often jump against one another with bills and legs, striking like a common fowl; and if in the attack one overthrows the other, the victor will, without scruple, and in the most unmerciful manner, pick his naked head till it becomes clotted with blood. When any crow gains such an advantage, the victor is assisted by several others, who appear to engage in the conflict solely because there seems to be no danger.

These birds are subject to a particular disease that I never remarked in the *vultur aura*. It consists of a kind of itching wart, which often covers the whole of the skin of their head and back of the neck, having a reddish appearance, and suppurating with a very fetid, greenish humour. The bird thus afflicted scratches these warts almost constantly; and the more irritated, the larger they grow. In every one of these warts I have found fastened, as a common leech to the real skin, a small worm, very like some of those which torment certain quadrupeds, particularly, in this country, the common grey squirrel. I never could ascertain if these parasites killed the birds, but I am certain that many die during winter, or through some means to me unknown. These worms are killed by the bird, as I have found many of the warts dried, although large, but without any tenant, after a continuance of cold weather. It is not improbable that the continued filth attached to the head of these birds, after being immersed in the decayed flesh of the animals they feed on, occasions their birth. I have observed this to take place generally with the younger carrion-crows, who, from the tenderness of their skin, are probably more liable to these vermin, and the older ones probably clear themselves of them more easily, as their skulls and skins become tougher.—ARCANA OF SCIENCE, 1828.

* COURTS OF JUSTICE AMONG CROWS.—Those extraordinary assemblies, which may be called crow courts, are observed here (in the Feroe Islands) as well as in the Scotch isles; they collect in great numbers, as if they had been all summoned for the occasion. A few of the flock sit with drooping heads—others seem as grave as if they were judges; and some are exceedingly active and noisy, like lawyers and witnesses: in the course of about an hour the company generally disperse, and it is not uncommon, after they have



(The Piping Crow.)

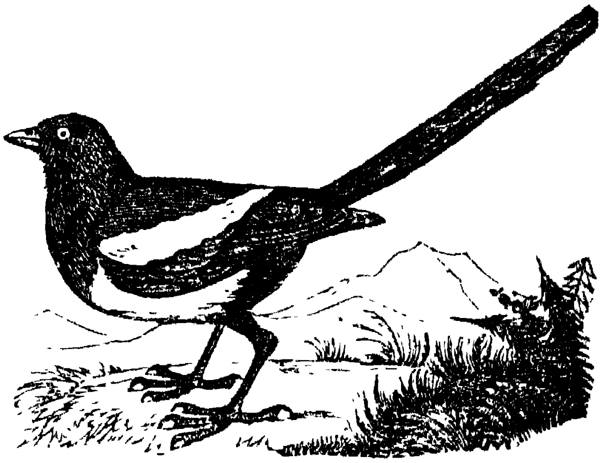
CHAP. III.

THE MAGPIE AND ITS AFFINITIES.

THERE are such a variety of birds that may be distributed under this head, that we must not expect very precise ideas of any. To have a straight, strong bill, legs formed for hopping, a body of about the size of a magpie, and party-coloured plumage, are the only marks by which I must be contented to distinguish this numerous fantastic tribe, that add to the beauty, though not to the harmony of our landscapes. In fact, their chattering every where disturbs the melody of the lesser warblers; and their noisy courtship not a little damps the song of the linnet and the nightingale.

However, we have very few of this kind in our woods compared to those in the neighbourhood of the line. There they not only paint the scene with the beauty and the variety of their plumage, but stun the ear with their vociferation. In those luxurious forests, the singing birds are scarce ever heard, but a hundred varieties of the pie, the jay, the roller, the chatterer, and the toucan, are continually in motion, and with their illusive mockeries disturb or divert the spectator, as he happens to be disposed.

The MAGPIE is the chief of this kind with us, and is too well known to need a description. Indeed, were its other accomplishments equal to its beauty, few birds could be put in competition. Its black, its white, its green and purple, with the rich and gilded combination of the glosses on its tail, are as fine as any that adorn the most beautiful of the feathered tribe. But it has too many of the qualities of a beau to depreciate these natural perfections: vain, restless, loud, and quarrelsome, it is an unwelcome intruder every where; and never misses an opportunity, when it finds one, of doing mischief.


(The Magpie.)

In all its habits it discovers a degree of instinct unusual to other birds. Its nest is not less remarkable for the manner in which it is composed than for the place the magpie takes to build it in.* The nest is usually placed conspicuous

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flown away, to find one or two left dead on the spot.—Sandt's Description of Feroe Islands.

Dr. Edmonstone, in his View of the Shetland Islands, says that sometimes the crow court, or meeting, does not appear to be complete before the expiration of a day or two, crows coming from all quarters to the sessions. As soon as they have all arrived, a very general noise ensues, the business of the court is opened, and shortly after, they all fall upon one or two individual crows (who are supposed to have been condemned by their peers), and put them to death. When the execution is over, they quietly disperse.

* Magpies' Nests.—"Amongst our larger birds, the magpie excels all her congeners in architectural skill. Several of the older naturalists were inclined to attribute to her more ingenuity than facts will corroborate.* Albertus Magnus, for example, says she not only constructs two passages for her nest, one for entering, and another for going out, but frequently makes two nests on contiguous trees,

enough, either in the middle of some hawthorn bush, or on the top of some high tree. The place, however, is always found difficult of access; for the tree pitched upon usually grows in some thick hedgerow, fenced by brambles at the root; or sometimes one of the higher bushes is fixed upon for the purpose. When the place is thus chosen as inaccessible as possible to men, the next care is to fence the nest above, so as to defend it from all the various enemies of air. The kite, the crow, and the sparrow-hawk, are to be guarded against; as their nests have been sometimes plundered by the magpie, so it is reasonably feared that they will take the first opportunity to retaliate. To prevent this, the magpie's nest is built with surprising labour and ingenuity.

The body of the nest is composed of hawthorn branches; the thorns sticking outward, but well united together by their mutual insertions. Within it is lined with fibrous roots, wool, and long grass, and then nicely plastered all round with mud and clay. The body of the nest being thus made firm and commodious, the next work is to make the canopy which is to defend it above. This is composed of the sharpest thorns, woven together in such a manner as to deny all entrance except at the door, which is just large enough to permit egress and regress to the owners. In this fortress the male and female hatch and bring up their brood with security, sheltered from all attacks but those of the climbing schoolboy, who often finds his torn and bloody hands too dear a price for the eggs or the young ones. The magpie lays six or seven eggs, of a pale green colour, spotted with brown.

This bird, in its domestic state, preserves its natural character with strict propriety. The same noisy, mischievous habits attend it to the cage that marked it in the woods; and being more cunning, so it is also a more docile bird than any other taken into keeping. Those who are desirous of teaching it to speak, have a foolish custom of cutting its tongue, which only puts the poor animal to pain, without improving its speech in the smallest degree. Its speaking is sometimes very distinct; but its sounds are too thin and sharp to be an exact imitation of the human voice, which the hoarse raven and parrot can counterfeit more exactly.*

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with the design of misleading plunderers, who may as readily choose the empty nest as the one containing the eggs, on the same principle that Dionysius the tyrant had thirty sleeping rooms. Others maintain that the opening opposite the passage is for the tail of the mother bird when hatching. Before speculating on the use of this, it would have been well to ascertain its existence; for among the numerous magpies' nests we have seen, (two very perfect ones are now before us,) the alleged second opening is by no means apparent, though in some instances the twigs may appear more loosely woven than in others, but seldom so much so, we think, as to permit a passage to the bird."—Rennie on the Architecture of Birds.

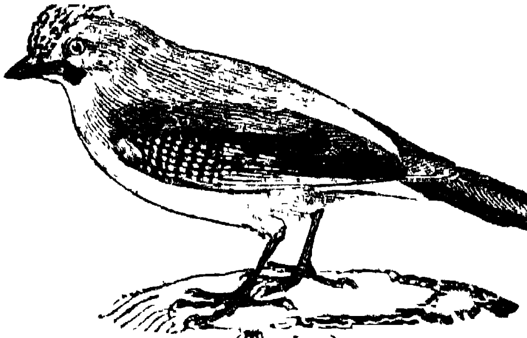
Haunts of Magpies.—There is considerable discrepancy in the accounts given by naturalists of the haunts of the magpie. "The tall tangled hedgerow," says Mr. Knapp, "the fir grove, or the old, well wooded inclosure constitute its delight, as there alone its large, dark nest has any chance of escaping observation."—Journal of a Naturalist.

"It always builds a solitary nest either in a thorn bush, or on some lofty elm, and sometimes on an apple-tree: it does not often build very near dwelling houses, but a remarkable exception to this has lately occurred in Somersetshire, at Huntspill; a magpie not only having built its nest on a tree a very short distance from a dwelling house, but it occupied the same nest two years successively.—Jennings.

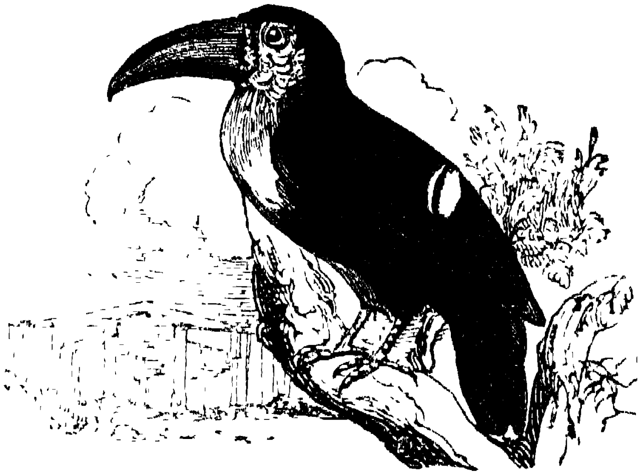
Wilson, on the other hand, speaking, we apprehend, of its habits in Scotland as well as in America, says "it generally selects a tall tree adjoining the farm-house for its nest, which is placed amongst the highest branches.

* The Maid and Magpie.—A bell-founder, in the parish of Saint Jean en Greve, at Paris, having lost from time to time several silver spoons, and other articles of value, at length suspected his servant maid to be the thief; and in order to satisfy himself, and to detect her, if possible, he laid a couple of silver trinkets in an apartment to which himself, his wife, and the said servant, were the only persons who had access. On the following day the trinkets were missing, and suspicion of course fell on the maid. The master questioned her as to her having been in the room; the girl hesitated for some moments, and then in a faltering tone of voice,

To this tribe we may refer the JAY, which is one of the most beautiful of the British birds. The forehead is white, streaked with black; the head is covered with very long feathers, which it can erect into a crest at pleasure; the whole neck, back, breast, and belly, are of a faint purple, dashed with grey; the wings are most beautifully barred with a lovely blue, black, and white; the tail is black, and the feet of a pale brown. Like the magpie, it feeds upon fruits, will kill small birds, and is extremely docile.


(The Jay.)

To this class may be added a numerous list from all the tropical forests of the east and west; where the birds are remarkable for discordant voices and brilliant plumage. I will fix only upon one, which is the most singular of all the feathered creation. This is the TOUCAN, a bird of the pie kind, whose bill is nearly as large as the rest of its whole body.


(The Toucan.)

Of this extraordinary bird there are four or five varieties. I will only describe the red-beaked toucan; and as the figure of this bird makes the principal part of its history, I will follow Edwards through all the minutiæ of its singular conformation. It is about the size of, and shaped like, a jackdaw, with a large head to

said she remembered to have opened the door of that room to admit the air, but had seen nothing of the things lost. This reply seemed to confirm her master more in his opinion of her guilt; he accordingly had her taken up on suspicion, and she was fully committed for trial.

After the usual ceremonies of the trial, in which the passions and prejudices of the judges and accusers, but too frequently usurp the seat of impartial investigation, she was found guilty of the alleged crime, and suffered death accordingly. Some time afterwards, the bell-founder was sent for to arrange and repair the church-bells; and on entering the steeple to examine the same, he was much surprised to find a favourite magpie he had kept about his house, perched up near the church clock. Struck with the appearance of his old inmate in so uncommon a place, he could hardly believe it to be the same; to satisfy himself he therefore called the bird by its name, Mag! Mag! The bird then hopped a few paces towards the man, stopped suddenly, ruffled up his plumage, chattered in his way, and then fled away to a hole in the roof. Curiosity led the man to follow it; but what words can express his astonishment and confusion, when he beheld deposited in a corner of the hole, the identical articles for which the poor unfortunate girl lost her life, and several others he had missed at different times.

The whole of this extraordinary affair was soon publicly known. The people, in a paroxysm of enthusiastic zeal, threatened vengeance on the girl's accusers and judges, and to prevent those serious consequences so much apprehended, it was found necessary to appease the multitude by an order that mass should be said, and a solemn *Domine exaudi* offered up for the peace of her soul, in the church of St. Jean en Greve, where this tragedy is recorded, and where virgins of the surrounding neighbourhood repair annually at midnight, dressed in robes of the whitest support its monstrous bill: this bill, from the angles of the mouth to its point, is six inches and a half; and its breadth, in the thickest part, is a little more than two.* Its thickness near the head is one inch and a quarter; and it is a little rounded along the top of the upper chap, the under side being round also; the whole of the bill extremely slight, and a little thicker than parchment. The upper chap is of a bright yellow, except on each side, which is of a fine scarlet colour; as is also the lower chap, except at the base, which is purple. Between the head and the bill there is a black line of separation all round the base of the bill; in the upper part of which the nostrils are placed, and are almost covered with feathers; which has occasioned some writers to say, that the toucan has no nostrils. Round the eyes, on each side of the head, is a space of bluish skin, void of feathers, above which the head is black, except a white spot on each side joining to the base of the upper chap. The hinder part of the neck, the back, wings, tail, belly, and thighs, are black. The unde side of the head,

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lawn, and bearing each a branch of cypress to sing a requiem, and to implore the divine protection for the innocent sufferer. The ceremony is still commemorated, and is called "the mass of the magpie." A popular drama is likewise founded on the incident.

Omen.—In most countries the magpie is esteemed a bird of omen. In various parts of Scotland and the north of England, if one of these birds is observed flying by itself, it is accounted by the vulgar, ill luck; if two, they forebode something fortunate, and so on. There is a rude rhyme on the subject which we have heard in Scotland:

One is joy,
Two is grief,
Three is marriage,
Four is death.—Ed.

* **The Beak of the Toucan.**—The enormous beak is nearly as long as the body; and this circumstance has given rise to the belief that the toucan is greatly embarrassed by this extraordinary provision of nature, and rendered incapable of those active movements which so peculiarly distinguish the feathered race If the beak, indeed, were constructed in that solid manner which we ordinarily observe in birds of prey, and in those who live upon hard substances, we should not be surprised to find so considerable an appendage weighing down the unfortunate bird's head, and unfitting it for upward flight, or even for ordinary vision, except in one direction. In that case the toucan must have been doomed to a grovelling life upon the earth, perpetually striving to use its brilliant wings, and longing to search for food among the high branches of fruit-bearing trees, but striving and longing in vain. This would not have been in conformity with the usual harmony of nature; and, therefore, in spite of its enormous beak, we find the toucans flying as nimbly as any other bird from tree to tree, perching on the summits of the very highest, searching for fruit with restless activity, pursuing small birds, which, it is now ascertained, form part of their food, and defending their young with unremitting vigilance against serpents, monkeys, and other enemies. All these functions of their existence could not have been performed if the specific gravity of the beak were equal to its dimensions. But it is not so. As compared, in specific gravity, with the beak of a hawk for instance, the beak of the toucan may be said to stand in the same relation to it as a piece of pumice-stone to a piece of granite. The exterior of the beak is a spongy tissue, presenting a number of cavities, formed by extremely thin plates, and covered with a hard coat scarcely thicker. This remarkable beak forms almost as curious and wonderful an example of peculiar organization as the trunk of an elephant. We are not so intimately acquainted with its uses; but there can be no doubt that the instrument is admirably adapted to the necessities of the toucan's existence.

The toucans, as well as the aracaris, which they greatly resemble, are found in the warmest parts of South America. Their plumage is brilliant; and their feathers have been employed as ornaments of dress by the ladies of Brazil and Peru. Several specimens have been kept alive in this country. Mr. Broderip, in the Zoological Journal for January, 1825, has given an interesting account of a specimen in a small menagerie, whose habits he watched with great care. By this examination the fact was established that the toucan ordinarily feeds on small birds. The toucan in question, upon a goldfinch being put into his cage, would instantly kill it by a squeeze of his bill, and then deliberately pull his prey to pieces, swallowing every portion, not excepting the beak and the legs. Mr. Broderip states that the toucan appeared to derive the greatest satisfaction from the act of eating, which he ascribes to the peculiar sensibility of the internal part of the beak. He never used his foot except to confine his prey on the perch; the beak was the only instrument employed in tearing it to pieces. It appears, also, that this bird subjects some of its food to a second mastication by its beak, in a manner somewhat resembling the similar action in ruminating animals.—Le Vaillant's Hist. Nat.

throat, and the beginning of the breast, are white. Between the white on the breast, and the black on the belly, is a space of red feathers, in the form of a new moon, with its horns upwards. The legs, feet, and claws, are of an ash-colour; and the toes stand like those of parrots, two before and two behind.

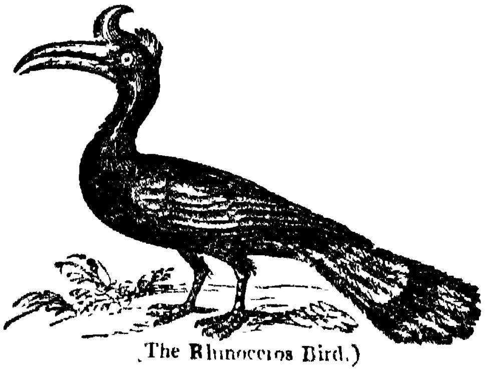
It is reported by travellers, that this bird, though furnished with so formidable a beak, is harmless and gentle, being so easily made tame, as to sit and hatch its young in houses. It feeds chiefly upon pepper, which it devours very greedily, gorging itself in such a manner, that it voids it crude and unconcocted. This, however, is no objection to the natives from using it again; they even prefer it before that pepper which is fresh gathered from the tree: and seem persuaded that the strength and heat of the pepper is qualified by the bird, and that all its noxious qualities are thus exhausted.

Whatever be the truth of this report, nothing is more certain than that the toucan lives only upon a vegetable diet; and in a domestic state, to which it is frequently brought in the warm countries where it is bred, it is seen to prefer such food to all other. Pozzo, who bred one tame, asserts that it leaped up and down, wagged the tail, and cried with a voice resembling that of a magpie. It fed upon the same things that parrots do; but was most greedy of grapes, which, being plucked off one by one, and thrown into the air, it would most dexterously catch before they fell to the ground. Its bill, he adds, was hollow, and upon that account very light, so that it had but little strength in so apparently formidable a weapon: nor could it peck or strike smartly therewith. But its tongue seemed to assist the efforts of this unwieldy machine: it was long, thin, and flat, not unlike one of the feathers on the neck of a dunghill cock; this it moved up and down, and often extended five or six inches from the bill. It was of a flesh colour, and very remarkably fringed on each side with very small filaments, exactly resembling a feather.

It is probable that this long tongue has greater strength than the thin, hollow beak that contains it. It is likely that the beak is only a kind of sheath for this peculiar instrument, used by the toucan, not only in making itself a nest, but also in obtaining its provision. Nothing is more certain than that this bird builds its nest in holes of trees, which have been previously scooped out for this purpose; and it is not very likely that so feeble a bill could be very serviceable in working upon such hard materials.

Be this as it will, there is no bird secures its young better from external injury than the toucan. It has not only birds, men, and serpents to guard against, but a numerous tribe of monkeys, still more prying, mischievous, and hungry than all the rest. The toucan, however, scoops out its nest in the hollow of some tree, leaving only a hole large enough to go in and out at. There it sits, with its great beak, guarding the entrance; and if the monkey ventures to offer a visit of curiosity, the toucan gives him such a welcome, that he presently thinks proper to pack off, and is glad to escape with safety.

This bird is only found in the warm climates of South America, where it is in great request, both for the delicacy of its flesh, which is tender and nourishing, and for the beauty of its plumage, particularly the feathers of the breast. The skin of this part the Indians pluck off, and, when dry, glue to their cheeks; and this they consider as an irresistible addition to their beauty.*



(The Rhinoceros Bird.)

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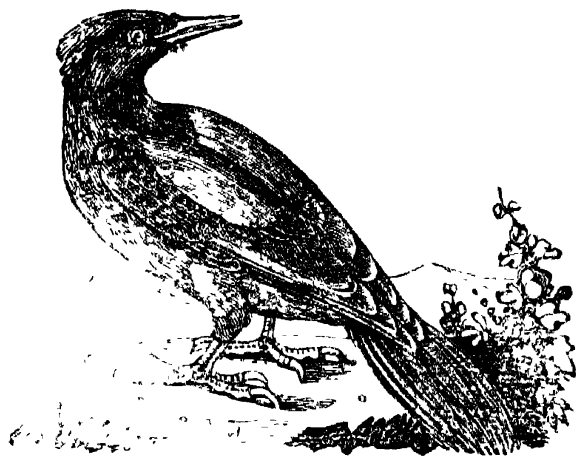
* The Rhinoceros Bird.—This curious bird is of the order *Picæ*, or Pies, and of the genus *Buceros*, consisting of birds of rather large size, and distinguished by the disproportionate forms of their beaks, which are often still further remarkable for some kind of large prominence on the upper mandible. The most conspicuous species is the *Buceros Rhinoceros* of Linnæus, commonly called the rhinoceros bird.

Its general size is that of a turkey, but with a much more slenderly proportioned

CHAP. IV.

THE WOODPECKER AND ITS AFFINITIES.

We come now to the numerous tribe of WOODPECKERS; a class easily distinguishable from all others, both for their peculiar formation, their method of procuring food, and their manner of providing a place of safety for their young. Indeed, no other class of birds seems more immediately formed for the method of life they pursue, being fitted by nature, at all points, for the peculiarity of their condition. They live chiefly upon the insects contained in the body of trees, and for this purpose are furnished with a straight, hard, strong, angular, and sharp bill, made for piercing and boring. They have a tongue of a very great length; round, ending in a sharp, stiff, bony thorn, dentated on each side, to strike ants and insects when dislodged from their cells. Their legs are short and strong, for the purposes of climbing.*



(The Black Woodpecker.)

Of this bird there are many kinds, and many varieties in each kind. They form large colonies in the forests of every part of the world. They differ in size, colour, and appearance; and agree only in the marks above-mentioned, or in those habits which result from so peculiar a conformation. Instead, therefore, of descending into a minute discrimination of every species, let us take one for a pattern, to which all the rest will be found to bear the strongest affinity. Words can but feebly describe the plumage of a bird; but it is the province of history to enter into a detail of every animal's pursuits and occupations.

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body. Its colour is black, with the tail white, crossed by a black bar: the beak is of enormous size, of a lengthened, slightly curved, and pointed shape, and on the upper mandible, towards the base, is an extremely large process, equal in thickness to the bill itself, and turning upwards and backwards in the form of a thick, sharp-pointed horn, somewhat resembling the horn of the rhinoceros. The use of this strange proboscis is by some supposed to be that of enabling the bird more easily to tear out the entrails of its prey; but others affirm that it is not of a predaceous nature, feeding only on vegetable substances. This bird is principally found in the East Indian Islands. A remarkably fine specimen was preserved in the Leverian Museum.—Mirror, vol. xix.

* Woodpecker Genus.—Though the woodpeckers constitute a very natural genus, and all appear as though they were formed on one type, yet the manners of some species vary considerably. There are some which do not climb, although their organization might lead us to believe they did, but, on the contrary, they live on the ground or in the rocks.

The *Picus Viridis* is the most common species in Europe, where it is well known, under various names, derived from its colour and habits. It usually abides in forests, which it causes to re-echo with its harsh and piercing cries, resembling the words *tiacacan, tiacacan*, which are heard at a considerable distance, and which it particularly utters when flying. Beside this, its usual cry, it has a love-note, which in some sort resembles a noisy and continued burst of laughter, repeated thirty or forty times in succession. It has also another very different and plaintive cry which the peasants in some places imagine to announce the approach of rain. This bird wants the intestines, which anatomists call the *cæcum*—a circumstance peculiar to this tribe only.

The green woodspite or woodpecker is called the rain-fowl in some parts of the country; because, when it makes a greater noise than ordinary, it is supposed to foretell rain. It is about the size of a jay; the throat, breast, and belly are of a pale-greenish colour; and the back, neck, and covert feathers of the wings are green. But the tongue of this little animal makes its most distinguished characteristic, as it serves for its support and defence. As was said above, the woodpecker feeds upon insects; and particularly on those which are lodged in the body of hollow or of rotting trees. The tongue is its instrument for killing and procuring this food; which cannot be found in great plenty. This is round, ending in a stiff, sharp, bony tip, dentated on both sides like the beard of an arrow; and this it can dart out three or four inches from the bill, and draw it in again at pleasure. Its prey is thus transfixed, and drawn into the bill, which, when swallowed, the dart is again launched at fresh game. Nothing has employed the attention of the curious in this part of anatomy, more than the contrivance by which the tongue of this bird performs its functions with such great celerity. The tongue is drawn back into the bill by the help of two small, round cartilages, fastened into the fore-mentioned bony tip, and running along the length of the tongue. These cartilages, from the root of the tongue, take a circuit beyond the ears; and being reflected backwards to the crown of the head, make a large bow. The muscular, spongy flesh of the tongue, incloses these cartilages, like a sheath; and is so made that it may be extended or contracted like a worm. The cartilages, indeed, have muscles accompanying them along their whole length backwards. But there is still another contrivance; for there is a broad muscle joining the cartilages to the bones of the skull, which, by contracting or dilating, forces the cartilages forward through the tongue, and then forces the tongue and all through the bill, to be employed for the animal's preservation, in piercing its prey.

Such is the instrument with which this bird is provided; and this the manner in which this instrument is employed. When a woodpecker, by its natural sagacity, finds out a rotten, hollow tree, where there are worms, ants' eggs, or insects, it immediately prepares for its operations. Resting by its strong claws, and leaning on the thick feathers of its tail, it begins to bore with its sharp, strong beak, until it discloses the whole internal habitation. Upon this, either through pleasure at the sight of its prey, or with a desire to alarm the insect colony, it sends forth a loud cry, which throws terror and confusion into the whole insect tribe. They creep hither and thither, seeking for safety; while the bird luxuriously feasts upon them at leisure, darting its tongue with unerring certainty, and devouring the whole brood.*

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* THE IVORY-BILLED WOODPECKER.— This majestic and formidable species in strength and magnitude stands at the head of the whole class of woodpeckers hitherto discovered. He may be called the king or chief of his tribe; and nature seems to have designed him a distinguished characteristic in the superb carmine crest and bill of polished ivory with which she has ornamented him. His eye is brilliant and daring; and his whole frame so admirably adapted for his mode of life, and method of procuring subsistence, as to impress on the mind of the examiner the most reverential ideas of the Creator. His manners have also a dignity in them superior to the common herd of woodpeckers. Trees, shrubbery, orchards, rails, fence-posts, and old prostrate logs, are alike interesting to those; but the royal hunter now before us scorns the humility of such situations, and seeks the most towering trees of the forest, seeming particularly attached to those prodigious cypress swamps, whose crowded, giant sons stretch their bare and blasted or moss-hung arms midway to the skies. In these almost inaccessible recesses, amid ruinous piles of impending timber, his trumpet-like note and loud strokes resound through the solitary, savage wilds, of which he seems the sole lord and inhabitant. Wherever he frequents, he leaves numerous monuments of his industry behind him. We there see enormous pine trees, with cart-loads of bark lying around their roots, and chips of the trunk itself, as to suggest the idea that half a dozen of axe-men had been at work there for the whole morning. The body of the tree is also disfigured with such numerous and so large excavations, that one can hardly conceive it possible for the whole to be the work of a woodpecker. With such strength, and an apparatus so powerful, what havoc might he not commit, if numerous, on the most useful of our forest trees! and yet,

The woodpecker, however, does not confine its depredations solely to trees, but sometimes lights upon the ground, to try its fortune at an ant-hill. It is not so secure of prey there as in the former case, although the numbers are much greater. They lie generally too deep for the bird to come at them; and it is obliged to make up by stratagem the defect of power. The woodpecker first goes to their hills, which it pecks, in order to call them abroad; it then thrusts out its long red tongue, which being like a worm, and resembling their usual prey, the ants come out to settle upon in great numbers; however, the bird watching the properest opportunity, withdraws its tongue at a jerk, and devours the devourers. This stratagem it continues till it has alarmed their fears, or till it is quite satisfied.*

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with all these appearances, and much of vulgar prejudice against him, it may fairly be questioned whether he is at all injurious; or, at least, whether his exertions do not contribute most powerfully to the protection of our timber. Examine closely the tree where he has been at work, and you will soon perceive that it is neither from motives of mischief nor amusement that he slices off the bark or digs his way into the trunk: for the sound and healthy tree is the least object of his attention. The diseased, infected with insects and hastening to putrefaction, are *his* favourites; there the deadly, crawling enemy have formed a lodgement, between the bark and tender wood, to drink up the very vital part of the tree. It is the ravages of these vermin that the intelligent proprietor of the forest deplores, as the sole perpetrators of the destruction of his timber. Would it be believed that the larvæ of an insect or fly, no larger than a grain of rice, should silently, and in one season, destroy some thousand acres of pine trees, many of them from two to three feet in diameter, and a hundred and fifty feet high. Yet whoever passes along the high-road from Georgetown to Charleston, in South Carolina, about twenty miles from the former place, can have striking and melancholy proofs of this fact. In some places, the whole woods, as far as you can see around you, are dead, stripped of the bark, their wintry-looking arms and bare trunks bleaching in the sun, and tumbling in ruins before every blast, presenting a frightful picture of desolation. And yet ignorance and prejudice stubbornly persist in directing their indignation against the bird now before us, the constant and mortal enemy of these very vermin, as if the hand that probed the wound to extract the cause should be equally detested with that which inflicted it; or as if the thief-catcher should be confounded with the thief. — WILSON, AMERICAN ORNITHOLOGY.

* THE WRYNECK.—There is a close analogy between the wryneck (*Yunx*) and the woodpeckers, in the extensibility of the tongue, and the position of the toes; but they differ in the want of the piercing bill. The wryneck (*Yunx Torquilla*), which gives its name to the genus, derives that name from a habit of turning its neck, with a slow undulating motion, like that of a serpent, turning its head towards the back, and closing its eyes; this movement appears to be the result of surprise, terror, or astonishment, at the sight of some novel object. It is also an effort which the bird appears to make to disengage itself when it is held; but as it executes it equally in a state of liberty, and as the young, even in the nest, have the same habit, it is clear it must be the result of a peculiar conformation.

The wryneck is a solitary bird, which voyages and lives alone, except during the season of love, in which it is seen in society with its female. It arrives in these countries alone, in the month of May, and departs in the same manner in September. It crooks itself to the trunk of a tree, but does not climb, though its feet seem conformed for that motion, like those of the woodpeckers. It even seldom perches, except for the purpose of going to sleep. It is most frequently seen on the ground, where it collects its food; it darts its long tongue into an ant-hill, and draws it out loaded with those insects. The female makes no nest, but lays in the hollows of trees, in the dust of rotten wood. This species, without being numerous, is extended throughout all Europe, from Greece to Lapland.

CHARACTERISTICS.—The abject and degraded character which the Count de Buffon, with equal eloquence and absurdity, has drawn of the whole tribe of woodpeckers, belongs not to the elegant and sprightly bird now before us (*Picus Auratus*, Gold-winged Woodpecker). How far it is applicable to any of them will be examined hereafter. He is not "constrained to drag out an insipid existence in boring the bark and hard fibres of trees to extract his prey," for he frequently finds in the loose, mouldering ruins of an old stump (the capital of a nation of pismires) more than is sufficient for the wants of a whole week. He cannot be said to "lead a mean and gloomy life, without an intermission of labour," who usually feasts by the first peep of dawn, and spends the early and sweetest hours of morning on the highest peaks of the tallest trees, calling on his mate or companions, or pursuing and gambolling with them round the larger limbs and body

The woodpecker takes no care to line its nest with feathers or straw; its eggs are deposited in the hole, without any thing to keep them warm, except the heat of the parent's body. Their number is generally five or six; always white, oblong, and of a middle size. When the young are excluded, and before they leave the nest, they are adorned with a scarlet plumage under the throat, which adds to their beauty.

In our climate, this bird is contented with such a wainscot habitation as has been described for its young; but in the warmer regions of Guinea and Brazil, they take a very different method to protect and hatch their nascent progeny. A traveller who walks into the forests of those countries, among the first strange objects that excite curiosity, is struck with the multitude of bird's nests hanging at the extremity of almost every branch. Many other kind of birds build in this manner; but the chief of them are of the woodpecker kind: and, indeed, there is not, in the whole history of nature, a more singular instance of the sagacity of those little animals in protecting themselves against such enemies as they have most occasion to fear. In cultivated countries, a great part of the caution of the feathered tribe is to hide or defend their nests from the invasions of man, as he is their most dreaded enemy: but in the depth of those remote and solitary forests, where man is but seldom seen, the little bird has nothing to apprehend from man. The parent is careless how much the nest is exposed to general notice; satisfied if it be out of the reach of those rapacious creatures that live by robbery and surprise. If the monkey or the snake can be guarded against, the bird has no other enemies to fear: for this purpose, its nest is built upon the depending points of the most outward branches of a tall tree, such as the banana or the plantain. On one of those immense trees, is seen the most various, and the most inimical assemblage of creatures that can be imagined. The top is inhabited by monkeys of some particular tribe, that drive off all others; lower down twine about the great trunk numbers of the larger snakes, patiently waiting till some unwary animal comes within the sphere of their activity; and at the edges of the tree hang these artificial nests, in great abundance, inhabited by birds of the most delightful plumage.*

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of the tree for hours together; for such are really his habits, &c. It is truly ridiculous and astonishing that such absurdities should escape the lips or pen of one so able to do justice to the respective merits of every species; but Buffon had too often a favourite theory to prop up, that led him insensibly astray; and so forsooth the whole family of woodpeckers must look sad, sour, and be miserable, to satisfy the caprice of a whimsical philosopher, who takes it into his head that they are, and ought to be, so.—WILSON, AMERICAN ORNITHOLOGY.

* FASCINATING POWER OF SERPENTS OVER BIRDS.—The following is an abstract of a paper by Dr. Barton, which appeared in the American Philosophical Transactions.

Every one is acquainted with the power ascribed to the rattle-snakes and other American serpents, of fascinating birds and small animals, such as the squirrel, and of depriving them of the power of escaping their magic influence; and which thus enables them to capture animals that otherwise would seem to have been placed entirely out of their reach. The unhappy animal is described as running up and down the tree, always going down more than it goes up, till at length it is drawn nearer to the snake, whose mouth is open to receive its victim. The poor little animal runs into the snake's jaws, uttering a piteous cry, and is immediately swallowed. This is the manner in which this fascinating power is exerted, as related by different authors. And this story has been repeated by naturalists in their histories of serpents. They seem credulously to have believed the accounts they received, and to have taken them for granted without sufficient examination. Linnæus says that this power was given to the rattle-snake as a compensation to it for the slowness of its motion. He seems to have received this tale from some of his pupils, and does not assert that he was ever the eye-witness of the fact. The existence of this power would be readily believed in by the uninformed, who always give credence to any tale of wonder. Where this belief originated, is unknown. Perhaps some traces of it may be discovered in the mythology of Asia and Africa. Some have referred it to the American Indians; while others, who have travelled amongst them, never heard any mention of the circumstance, although they heard them praise the ingenuity of these reptiles in catching birds, squirrels, &c. M. de la Cepede, in his *Histoire Naturelle des Serpens*, has paid great attention to this subject; and he offers two suppositions for the explanation of this miraculous power. One is, that the pestiferous breath

The nest is usually formed in this manner: when the time of incubation approaches, they fly busily about in quest of a kind of moss, called, by the English inhabitants of those countries, *old man's beard.* It is a fibrous substance, and not very unlike hair, which bears being moulded into any form, and suffers being glued together. This, therefore, the little woodpecker, called by the natives of Brazil, the Guiratemga, first glues by some viscous substance, gathered in the forest, to the extremest branch of a tree; then building downward, and still adding fresh materials to those already procured, a nest is formed, that depends, like a pouch, from the point of the branch: the hole to enter at, is on the side, and all the interior parts are lined with the fine fibres of the same substance, which compose the whole

Such is the general contrivance of these hanging nests: which are made, by some other birds, with still superior art.* A little bird of the grosbeak kind, in

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of the snake agitates the animal which it means to devour, and prevents its escape. Many persons assert that they never knew any disagreeable smell to proceed from these animals, even after they had been some time shut up in a box, while others say that a very offensive stench is continually arising from the body of the rattle-snake. Some have ascribed the motions of the birds that are introduced into the cages of these animals to the effect of their breath but these are probably caused by fear The rattle-snake has been known to continue for days coiled round a tree, on which the thrush or cat-bird were rearing their young, which, upon this supposition, must have perished The other supposition is that these animals have been slightly bitten But their actions are totally different from those observed in animals bitten by a rattlesnake, besides that the agitation of the bird has ceased on the death of the snake Nor is this power of fascination ascribed exclusively to the venomous serpents: for almost every species is supposed to be endued with it. Blumenbach ascribes it to the rattle on the tail of the rattle-snake, but this has been observed to be perfectly quiet at the time when the supposed charm is working and this explanation cannot apply to the other snakes Hence it appears that none of these explanations are satisfactory If we examine the species of birds that are generally observed to be enchanted, and the season when it takes place, we may perhaps arrive at a more probable solution of the problem Those birds that are led by instinct to build their nests on the ground, or on trees near the ground, have most frequently been observed to be under the enchanting influence of the rattle-snake; for it is well known that each kind of bird builds its nest in the same situation, at least in any one particular country. Upon inquiry concerning the time of the year when any bird had been seen under this influence, it was found, in almost every instance, to be that at which it was either laying its eggs or rearing its young. From these considerations it appeared probable that the cries and fears of birds, supposed to be fascinated, originated in an endeavour to protect their nest or young

The rattle-snake does not climb trees; but many other species do When a bird sees its well known enemy gliding up the tree to attack its nest, and devour its young, it naturally endeavours to defend them; and she attacks the snake with her wing, her beak, or her claws, and frequently drives it away, although sometimes she approaches so near as to fall a prey to her enemy This contest is by no means so unequal as might be supposed The bone on the top of the head of the rattle snake is thin and brittle, so much so that it is thought that a stroke from the wing of a thrush or robin would be sufficient to break it A thrush was observed seated on the back of a large, black snake which it was pecking with its beak. The snake was in the act of swallowing a young bird, and as soon as the snake was killed, the old bird flew away The cries and actions of this bird exactly resembled those ascribed to fascination The rattle snake lives chiefly on the great frog (*Rana ocellata*), and birds are very rarely found in its stomach. Birds and squirrels are by no means the principal food of serpents, and yet this influence is chiefly exerted upon them so it can hardly be considered as designed to secure food for these reptiles The black snake is often obliged to use great ingenuity to get at his food, which consists chiefly of eggs and young birds. If it possessed the power of fascination, it might secure for itself abundance of food, when the woods are swarming with birds, without having recourse to the artifice of suspending itself by its tail from a bough over a nest, the contents of which could not be reached by it in any other way.—ZOOLOGICAL MAGAZINE.

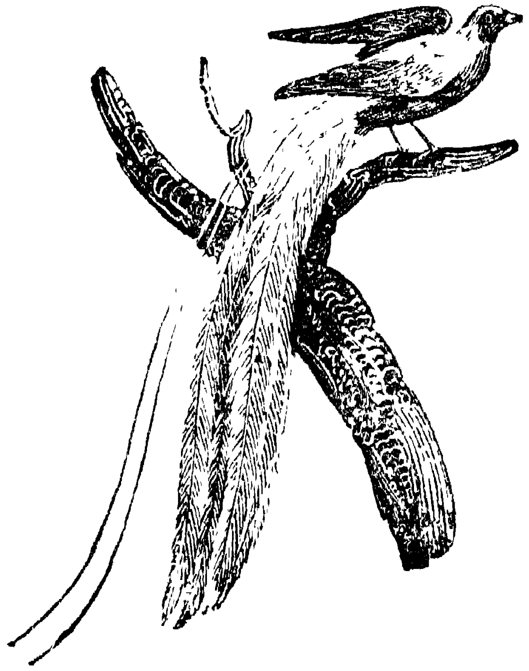
* EDIBLE BIRDS NESTS IN SIAM —Edible birds' nests are found in considerable quantity on the islands off the Tavoy coast, but they are very generally met with throughout the Archipelago. They are in most perfection in January, but are gathered also during the six weeks preceding and following that month. The quantity obtainable in any one

the Philippine islands, makes its nest in such a manner that there is no opening but from the bottom. At the bottom the bird enters, and goes up through a funnel, like a chimney, till it comes to the real door of the nest, which lies on one side, and only opens into this funnel.

Some birds glue their nest to the leaf of the banana-tree, which makes two sides of their little habitation; while the other two are artificially composed by their own industry. But these and all of the kind, are built with the same precautions to guard the young against the depredations of monkeys and serpents, which abound in every tree. The nest hangs there, before the spoilers, a tempting object, which they can only gaze upon, while the bird flies in and out, without danger or molestation, from so formidable a vicinity.

CHAP. V.

THE BIRD OF PARADISE AND ITS VARIETIES.



(The Bird of Paradise.)

There are few birds that have more deceived and puzzled the learned than this. Some have described it as an inhabitant of the air, living only upon the dew of heaven, and never resting below; others have acquiesced in the latter part of its history, but have given it flying insects to feed on. Some have asserted that it was without feet, and others have ranked it among the birds of prey.

The great beauty of this bird's plumage, and the deformity of its legs, seem to have given rise to most of these erroneous reports. The native savages of the Molucca Islands, of which it is an inhabitant, were very little studious of natural history; and perceiving the inclination the Europeans had for this beautiful bird, carefully cut off its legs before they brought it to market; thus concealing its greatest deformity, they considered themselves entitled to rise in their demands when they offered it for sale. One deceit led on to another; the buyer finding the bird without legs, naturally inquired after them; and the seller as naturally began to assert that it had none. Thus far the European was imposed

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season is uncertain, for Malay, Chinese, Siamese, and other boats are accustomed to come in amongst the islands, and to carry off part of the produce; it also partly depends upon the dexterity of the nester, who, by disturbing the swallows just when the nest is completed, obliges them to multiply their labours. The operation of the nester is not always free from danger, as he has to climb precipices by the help of ropes and flying ladders made of rattans, and the caves into which he has to penetrate are noisome, and in some places so intricate, that he is apt to lose himself. The nesters use considerable upon by others: in all the rest he imposed upon himself. Seeing so beautiful a bird without legs, he concluded that it could live only in air, where legs were unnecessary. The extraordinary splendour of its plumage assisted this deception; and as it had heavenly beauty, so it was asserted to have a heavenly residence. From thence its name, and all the false reports that have been propagated concerning it.*

Error, however, is short-lived; and time has discovered that this bird not only has legs, but very large strong ones for its size. Credulity when undeceived runs into the opposite extreme, and soon after this harmless bird was branded with the character of being rapacious, of destroying all those of smaller size, and from the amazing rapidity of its flight, as qualified peculiarly for extensive rapine. The real history of this pretty animal is at present tolerably well known; and it is found to be as harmless as it is beautiful.

There are two kinds of the BIRD OF PARADISE; one about the size of a pigeon, which is more common; the other not much larger than a lark, which has been described more imperfectly. They are both sufficiently distinguished from all other birds, not only by the superior vivacity of their tints, but by the feathers of the tail, there being two long slender filaments growing from the upper part of the rump; these are longer than the bird's body, and bearded only at the end. By this mark the bird of paradise may be easily known, but still more easily by its gaudy livery, which being so very brilliant, demands to be minutely described.

This bird appears to the eye as large as a pigeon, though in reality the body is not much greater than that of a thrush. The tail, which is about six inches is as long as the body, the wings are large compared with the bird's other dimensions. The head, the throat, and the neck are of a pale gold colour. The base of the bill is surrounded by black feathers as also the side of the head and throat, as soft as velvet, and changeable like those on the neck of a mallard. The hinder part of the head is of a shining green, mixed with gold. The body and wings are chiefly covered with beautiful brown, purple, and gold feathers. The uppermost part of the tail feathers are of a pale yellow, and those under them white and longer than the former, for which reason the hinder part of the tail appears to be all white. But what chiefly excites curiosity are the two long naked feathers above mentioned, which spring from the upper part of the rump above the tail, and which are usually about three feet long. These are bearded only at the beginning and the end, the whole shaft for above two feet nine inches being of a deep black, while the feathered extremity is of a changeable colour, like the mallard's neck.

This bird, which for beauty exceeds all others of the pie kind, is a native of the Molucca Islands, but found in greatest numbers in that of Aro. There, in

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quantities of arrack and opium. It is probable that the Burman collections did not exceed two peculs in the season, but there is little doubt that five or six times that quantity might be obtained.

The farm of these nests, which had let the year before only for 500 rupees, was knocked down since we took possession, at 15,000 rupees for those of the Tavoy Islands alone, and 5,000 rupees more were expected for those of the Mergui Islands. -ARCANA OF SCIENCE, 1828

* BIRD OF PARADISE.—Father Dominic Fernandez Navarretta, a Spanish Dominican friar, who in 1646 became resident in China, tells us that the bird of paradise has neither feet nor wings. Father Dominic viewed them carefully and could observe neither. They alight only on trees, moving as the wind wafts them, by means of long tails of various colours, and as fine as can be imagined. If the winds fail, they fall, and having a long bill, are precipitated head foremost to the ground, where they stick and are taken. "They look," says Father Dominic, "very glorious, and are beyond all nosegays." He presented a couple to a great lady, who had done him considerable courtesies. "I inquired," he continues, "after their nest, and how they hatched their eggs. They answered me that the hen laid her eggs upon the cock's back, and there hatched them. I made several objections, but they could give me no more satisfaction. It is certainly so; it seems, indeed, impossible; but it is easy to Him that made all things."—TRAVELLER'S TALES.

the delightful and spicy woods of that country, do these beautiful creatures fly in large flocks; so that the groves which produce the richest spices produce the finest birds also. The inhabitants themselves are not insensible of the pleasure these afford, and give them the name of God's birds, as being superior to all others that he has made. They live in large flocks, and at night generally perch upon the same tree. They are called by some the Swallows of Ternate, from their rapid flight, and from their being continually on the wing in pursuit of insects, their usual prey.*

As the country where they are bred has its tempestuous season, when rains and thunders continually disturb the atmosphere, these birds are then but seldom seen. It is thought that they then fly to other countries where their food appears in greater abundance; for, like swallows, they have their stated times of return. In the beginning of the month of August, they are seen in great numbers flying together; and, as the inhabitants would have us believe, following their king, who is distinguished from the rest by the lustre of his plumage, and that respect and veneration which is paid him.* In the evening they perch upon the highest trees of the forest, particularly one which bears a red berry, upon which they sometimes feed, when other food fails them. In what manner they breed, or what may be the number of their young, as yet remains for discovery.

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* The Lyre Bird, or Superb Menura.—New Holland, which affords so rich a harvest to the student of nature, and which produces the most singular and anomalous beings with which we are at present acquainted, is the native country of this rare and beautiful bird, the habits and manners of which are yet but little known. Considered by many naturalists as allied to the paradiseæ, or birds of paradise, it exhibits in its general form, and especially in the figure of its large elongated nails, which are evidently adapted for scratching up the soil, a certain degree of approximation to the gallinaceous tribe, to which others are inclined to refer it; but there is, however, a group of *ground thrushes* as they are expressively called, to which, in the characters of the plumage and in habits, it would appear, we think, to be still nearer related.

One of the earliest notices we have of this bird, is in Dr. Shaw's Miscellany, where it is characterized as the Parkinsonian paradise bird (*paradisea Parkinsoniana*); having, however, been previously described in the Linnæan Transactions, (vol. vi. p. 207, pl. 22), under the title of *menura superba*. Mons. Vieillot, who received from Mr. Sydenham Edwards a drawing of the bird, gave it, in his work on the birds of paradise, the name of Paradisea Parkinsoniana, in honour of J. Parkinson, Esq., of the Leverian museum, through whose means he obtained the drawing: but the original title, as given in the Linnæan Transactions, is that which is now received. Dr. Shaw, in his account of the manners of the superb menura, says, "At the early part of the morning it begins singing, having (as is reported) a very fine natural note; and gradually ascending some rocky eminence, scratches up the ground in the manner of some of the pheasant tribe, elevating its tail, and at intervals imitating the notes of every other bird within hearing; and after having continued this exercise for about two hours, again descends into the valleys, or lower grounds." This account has been confirmed to us by the testimony of a gentleman, who, during his residence in New Holland, took particular pains to investigate its manners and habits: he describes the menura as being very shy and recluse, and consequently not easy to be observed. Its own notes are rich and melodious, and it imitates those of other birds with admirable tact and execution; these powers of melody are the more remarkable, as connected with its size and *rasorial* habits, for the voice both of the birds of paradise and of the gallinaceous tribe is harsh and discordant. Dr. Latham informs us that the menura is "chiefly found in the hilly parts of the country, and called by the inhabitants the 'mountain pheasant;' as to its general manners, very little has come to our knowledge. It will occasionally perch on trees, but for the most part is found on the ground, having the manners of our poultry, as is manifest from observing the ends of the claws, which in most specimens are much blunted." Like many other *desiderata* to the naturalist from New Holland, this curious bird has never been brought alive to Europe.

In size, the menura is about equal to a pheasant. Its general plumage is of a dull brown, inclining to rufous on the quill-feathers; the tail, which is much longer than the body, consists of feathers so arranged, and of such different sorts, as to form, when elevated, a figure bearing no unapt resemblance to an ancient lyre; the character of these feathers will be better conveyed by our annexed sketch than by description: the bill is compressed, the nostrils forming a longitudinal slit covered with bristle-like feathers; the legs are strong, the toes completely divided, and armed with powerful blunted nails, those of the hind claws being especially developed.

A good specimen of this curious bird, whose style of plumage and voice thus justify its title, is to be seen in the rich museum of the Zoological Society, where it obtains a provisional place among the *rasores*, or birds whose habits confine them to the naked ground as their legitimate province.

The natives, who make a trade of killing and selling these birds to the Europeans, generally conceal themselves in the trees where they resort, and having covered themselves up from sight in a bower made of the branches, they shoot at the birds with reedy arrows; and, as they assert, if they happen to kill the king, they then have a good chance for killing the greatest part of the flock. The chief mark by which they know the king is by the ends of the feathers in his tail, which have eyes like those of a peacock. When they have taken a number of these birds, their usual method is to gut them and cut off their legs; they then run a hot iron into the body, which dries up the internal moisture; and filling the cavity with salts and spices, they sell them to the Europeans for a perfect trifle.†

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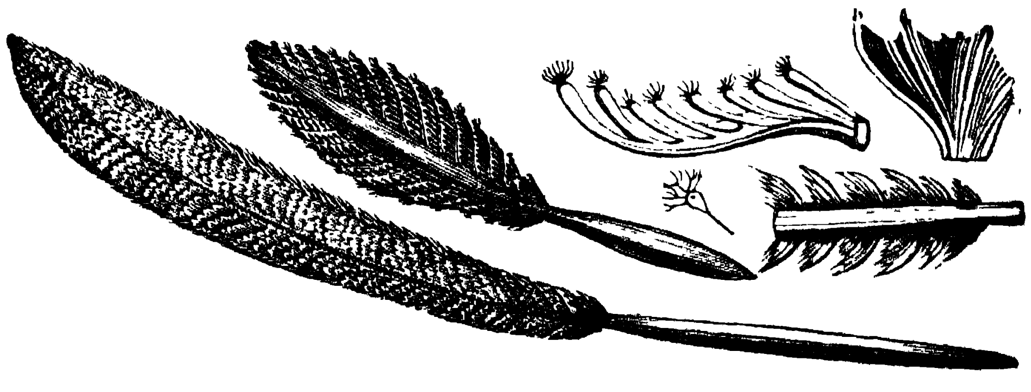
* Habits.—They always migrate in flocks of thirty or forty, and have a leader which the inhabitants of Aro call the king. He is said to be black, to have red spots, and to fly far above the flock which never desert him, but always settle in the same place that he does. They never fly with the wind, as in that case their loose plumage would be ruffled, and blown over their heads; and a change of wind compels them to alight on the ground, from which they cannot rise without great difficulty. When they are surprised by a heavy gale, they instantly soar to a higher region, beyond the reach of the tempest. There, in a serene sky, they float at ease on their light flowing feathers, or pursue their journey in security. During their flight they cry like starlings; but when a storm blows in the rear, they express their distressed situation by a note somewhat resembling the croaking of a raven. In calm weather, great numbers of these birds may be seen flying, both in companies and singly, in pursuit of the large butterflies and other insects on which they feed.

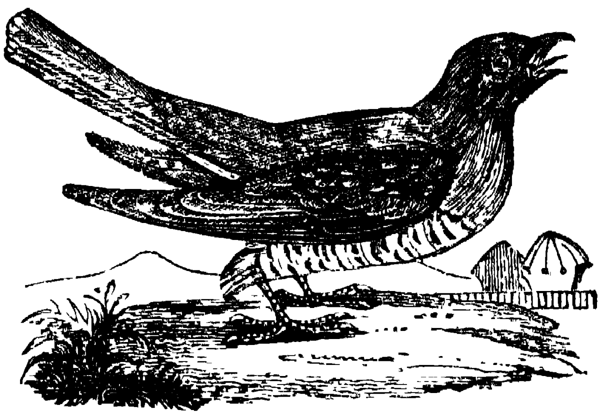
† The Magnificent Bird of Paradise.—This elegant species, remarkable for the splendour and variety of its colours, is principally found in the Molucca Islands, and is somewhat smaller than the common bird of Paradise. This splendid bird inhabits New Holland likewise, and is nine inches long.

There have been ten of this species discovered lately, among which is the Grakle Bird of Paradise, inhabiting the Philippine Islands.



CHAP. VI.

THE CUCKOO AND ITS VARIETIES.



(The Cuckoo.)

From a bird of which many fables have been reported, we pass to another tha has not given less scope to fabulous invention. The note of the CUCKOO i known to all the world; the history and nature of the bird itself still remains in great obscurity. That it devours its parent, that it changes its nature with the season, and becomes a sparrow-hawk, were fables invented of this bird, and are now sufficiently refuted. But where it resides in winter, or how it provides for its supply during that season, still continues undiscovered.

This singular bird, which is somewhat less than a pigeon, shaped like a magpie, and of a greyish colour, is distinguished from all other birds by its round prominent nostrils. Having disappeared all the winter, it discovers itself in our country early in the spring by its well known call. Its note is heard earlier or later as the season seems to be more or less forward, and the weather more or less inviting. From the cheerful voice of this bird, the farmer may be instructed in the real advancement of the year. The fallibility of human calendars is but too well known; but from this bird's note the husbandman may be taught when to sow his most useful seeds, and do such work as depends upon a certain temperature of the air. These feathered guides come to us heaven-taught, and point out the true commencement of the season.

The cuckoo, that was silent some time after its appearance, begins at first feebly, and at very distant intervals, to give its call, which, as the summer advances, improves both in its frequency and loudness. This is an invitation to courtship, and used only by the male, who sits generally perched upon some dead tree, or bare bough, and repeats his song, which he loses as soon as the genial season is over. His note is pleasant though uniform; and, from an association of ideas, seldom occurs to the memory without reminding us of the sweets of summer.* Custom too has affixed a more ludicrous association to this note, which, however, we that are bachelors need be in no pain about.†

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* The Cuckoo's Note.—It is, perhaps, too much to say, that we have borrowed all our music from birds, but some of it is evidently a plagiarism. The cuckoo itself has done more for our music than musicians may be willing to allow; but it is no more than just to a despised bird to say, that from it we have derived the *minor scale*, whose origin has puzzled so many; the cuckoo's couplet being the *minor third* sung downwards.

† "When daisies pied, and violets blue,
And lady-smocks all silver white,
And cuckoo-buds of yellow hue,
Do paint the meadows with delight,
The cuckoo then, on every tree,
Mocks married men, for thus sings he,
Cuckoo!
Cuckoo! cuckoo! O word of fear!
Unpleasing to a married ear!" &c.
Love's Labour Lost.

This reproach seems to arise from this bird's making use of the bed or nest of another to deposit its own brood in.

However this may be, nothing is more certain than that the female makes no nest of her own. She repairs for that purpose to the nest of some other bird, generally the water-wagtail or hedge-sparrow, and having devoured the eggs of the owner, lays her own in their place. She usually lays but one, which is speckled, and of the size of a blackbird's. This the fond foolish bird hatches with great assiduity, and when excluded, finds no difference in the great ill-looking changeling from her own. To supply this voracious creature, the credulous nurse toils with unusual labour, no way sensible that she is feeding up an enemy to her race, and one of the most destructive robbers of her future progeny.*

It was once doubted whether these birds were carnivorous; but Reaumur was at the pains of breeding up several, and found that they would not feed upon bread or corn; but flesh and insects were their favourite nourishment. He found it a very difficult task to teach them to peck; for he was obliged to feed them for a full month, after they were grown as big as the mother. Insects, however, seemed to be their peculiar food when young; for they devoured flesh by a kind of constraint, as it was always put into their mouths; but meal-worm insects they flew to, and swallowed of their own accord most greedily.

The cuckoo, when fledged and fitted for flight, follows its supposed parent but for a little time; its appetites for insect food increasing, as it finds no great chance for a supply in imitating its little instructor, it parts good friends, the step-child seldom offering any violence to its nurse. Nevertheless, all the little birds of the grove seem to consider the young cuckoo as an enemy, and revenge the cause of their kind by their repeated insults. They pursue it wherever it flies, and oblige it to take shelter in the thickest branches of some neighbouring tree. All the smaller birds form the train of its pursuers; but the wry-neck, in particular, is found the most active in the chase; and from thence it has been called by many the cuckoo's attendant and provider. But it is very far from following with a friendly intention; it only pursues as an insulter or a spy, to warn all its little companions of the cuckoo's depredations.

Such are the manners of this bird while it continues to reside or to be seen amongst us.† But early, at the approach of winter, it totally disappears, and its passage can be traced to no other country. Some suppose that it lies hid in hollow trees; and others that it passes into warmer climates. Which of these opinions is true is very uncertain, as there are no facts related on either side that can be totally relied on.

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* Rearing the Cuckoo.—How soon would the breed of cuckoos be extinct if they made their nests and hatched their own young as other birds do! The very peculiar cry of the cuckoo would instantly lead every marauding urchin to their nests, and we should be deprived of that note which every one listens to with pleasure. The instinct, also, which leads the cuckoo to deposit its egg in the nest of that bird whose young, when hatched, are sufficiently small to enable the young cuckoo to master them, and whose food is most congenial with its nature, is very surprising. Thus we find the young cuckoo in the nests of the water-wagtail and the hedge-sparrow, whose young he contrives to eject from the nest as soon as they are hatched, as it would be impossible for the old birds to supply nourishment for the cuckoo as well as for their own young ones, especially as the former, as he increases in size, has a most voracious appetite. I had an opportunity of witnessing this in the case of a young cuckoo which was hatched in the nest of a water-wagtail, who had built in some ivy on a wall close to my house. It required the united efforts of both the old birds from morning to night to satisfy his hunger, and I never saw birds more indefatigable than they were. When the young cuckoo had nearly arrived at his full size, he appeared on the little nest of the water-wagtail like a giant in a cock-boat. Just before he could fly, he was put into a cage, in which situation the old birds continued to feed him, till by some accident he made his escape, and remained in a high elm tree near the house. Here the water-wagtails were observed to feed him with the same assiduity for at least a fortnight afterwards. This cuckoo was very pugnacious, and would strike with its wings, and open its mouth in great anger whenever I put my hand near him.—Jesse's Gleanings.

† Habits of the Cuckoo.—The best place for observing the habits of this bird, in England, is on the range of the Malvern Hills, where they abound, in the season, in extraordinary numbers, making the whole circuit of them resound continually with their note, in a most striking manner; and flying about, from tree to tree, in a way which would much

The most probable opinion on this subject is, that as quails and woodcocks shift their habitations in winter, so also does the cuckoo; but to what country it retires, or whether it has been ever seen on its journey, are questions that I am wholly incapable of resolving.

Of this bird there are many kinds in various parts of the world, not only differing in their colours but their size.* Brisson makes not less than twenty-eight sorts of them; but what analogy they bear to our English cuckoo, I will not take upon me to determine.† He talks of one, particularly of Brazil, as

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delight a person fond of natural history. The workmen of the neighbourhood say a bird comes with them, which they call the cuckoo's maid.—ARCANA OF SCIENCE, 1831.

* COLOUR OF THE CUCKOO.—The Continental naturalists have raised a controversy respecting the species of the common cuckoo, which is found to vary considerably in the colour of its plumage, one being thence called the red and another the grey cuckoo; the former supposed to be the Cŭculus hepáticus of Latham, and the latter the C. canŏrus of Linnæus. M Payrandeau, however, states distinctly, on the authority of a series of specimens, as well as of repeated dissection, that both the male and female young of the Cŭculus canŏrus, before the first moult, have the same colour; that, after the first moult, the males have a deep olive ash colour, and the red spots have already begun to disappear; in the females, on the contrary, the red spots become brighter and larger: that, at the third moult, the red spots on the male disappear altogether, while in the female they continue to the most advanced age, when it puts on the plumage of an old male, of which change M. Payrandeau possesses a specimen. M. Temminck, again, whose authority is very high, regards the red cuckoo as the young of the grey cuckoo of one year old; but Vieillot, the father of the French ornithologists, as well as Meyer, Jules, Delamothe, and Baillon of Abbeville, agree with M. Payrandeau.—ARCANA OF SCIENCE, 1830.

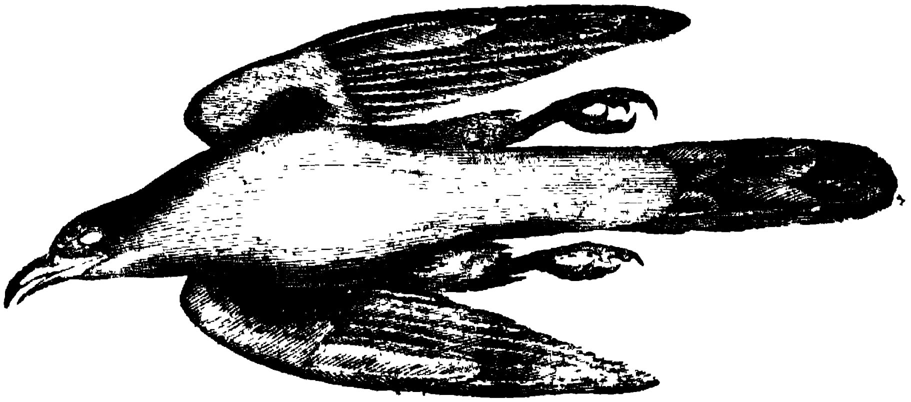
† NEW BRITISH SPECIES OF CUCKOO.—Professor Rennie has commenced a Journal of Observation, which he has not inappropriately named "The Field Naturalist's Magazine, and Review of Animals, Plants, Minerals, the Structure of the Earth, and Appearances of the Sky." We consider the title well chosen, if it be the Professor's intention to follow up the system of patient investigation which he has so laboriously developed in his entomological volumes of the Library of Entertaining Knowledge. These certainly entitle him to rank among the field naturalists of the day.

Among the first-fruits of Mr. Rennie's Journal is the figure of a new British species of cuckoo, from Robert Ball, Esq., of Dublin Castle. The bird was shot near Youghal, in the county of Cork; and Mr. Ball not finding more than one species of cuckoo, and that unlike his, in Mr. Rennie's edition of Montague's Ornithological Dictionary, was induced to consider his specimen as a *rara avis*. Mr. Ball continues—"Mr. Glenon, an intelligent professional mounter of birds, acquainted me that he had received a bird very like mine, recently shot at Old Connaught, near Bray, a short distance from Dublin. On comparison of our specimens, mine appears to be the larger and more highly coloured, in which particular it also excels a South American specimen, which Mr. Glenon is possessed of. The tail feathers of the latter, however, have the white somewhat more distinct at the points. The tail consists of ten feathers, the three outermost at each side tipped with white. The drawing conveys more distinctly than words can do the other peculiarities of colouring. The part not displayed in it is of uniform colour with the back of the head, except that the upper sides of the quill feathers have a warm, reddish cast. My bird is much smaller than the common cuckoo; the bill rather larger; the feet smaller; the shank longer. The drawing is of the exact size of the original. The fact of a second instance of the bird being killed in this country, will, I conceive, entitle it to a place in the catalogue of our natives."

The annexed figure is reduced by one-third from the original drawing, coloured, the description of which is as follows:—"Total length, from the tip of the bill to the end of the tail, eleven inches. Bill longer and rather more curved than in the common cuckoo; the upper mandible of a dark-horn colour, black at the tip, and yellowish brown at the base; the lower, yellowish brown, tipped with black. The head, back of the neck, and all the upper parts, of a uniform olive brown colour, inclining to red on the upper sides of the quill feathers; the whole under parts of a pale ashy brown, darker about the breast, and inclining to buff on the thighs and under tail coverts. Under surface of the wings, pale buff, making a considerable contrast with the

making a most horrible noise in the forests; which, as it should seem, must be a very different note from that by which our bird is distinguished at home.*

colour of the quill feathers, which are underneath of a brownish chestnut tint. The legs and feet of a dark ashy brown; the shank rather longer in proportion than in the common cuckoo. Tail, wedge-shaped, and about five inches in length; the outer feather but three inches; the second, four inches and a quarter; and the third, nearly five inches long; of an ash colour, edged and tipped with yellowish white *underneath*; the colour of the upper surface unknown; colour of the iris unknown; and, as in the common species, the third quill feather of the wing is the longest."



(New British species of Cuckoo.)

* Cuckoo kept in Confinement.—This specimen was taken from the nest of a titlark, near the village of Currie, in the end of July, 1827. It was then apparently about a fortnight old, and was not fully fledged until six weeks after. At first it was fed with bread and raw eggs made up into a paste. After this it was fed with roasted meat cut into small pieces; and ultimately with raw meat, which it prefers, but will not take unless perfectly fresh. At present it eats about a pound of meat weekly. It is very fond of insects of all kinds, and in autumn seemed to prefer the larvæ of butterflies. Its first moult commenced in the end of March last. Previous to this, the colour of the upper parts was deep brown, spotted with reddish-brown; the breast and belly greyish-white, with transverse bars of brown. During winter, it was dull through the day, and restless at night, flapping its wings for hours together. At present it is active through the day and quiet at night. About the beginning of March it was first heard to utter its peculiar cry, which it has repeated many times since; and one morning in the end of April it continued crying for a whole hour. Its chirping cry was given up about January. At present it has a sharp, weak scream, which it utters on being frightened or irritated. It did not eat of itself until nearly three months after it was found. It has always been very fond of heat, and is extremely sensible to cold, shivering intensely when the temperature is low. When the sun shines upon it, it expands all its feathers, especially those of the tail and wings, turning its back to the heat. When eating, it holds the piece of meat about three or four seconds, squeezing it with the points of its mandibles, which is supposed to be an instinctive action, the object of which is to deprive its prey of life, previous to swallowing it. The late Mr. Templeton of Belfast succeeded in keeping a cuckoo over winter, but it died in March, when the first moult commenced.—Arcana of Science, 1829.

Sweet, in his British Warblers, observes—"These birds, when in confinement, are very restless at the seasons of their usual migration from one country to another;—at the time that they are leaving this country in autumn, about twice during the winter, and again when they are returning in the spring. From their agitation at various times in the winter, it may be concluded that they visit more than one country after their departure from this. It is very curious to see them when in that state; their restlessness seems to come on them all at once; and generally in the evening, when they are sitting, seemingly quite composed, they start up suddenly and flutter their wings; sometimes flying direct to the top of the cage or aviary; at other times running backwards and forwards on their perches, continually flapping their wings, and looking upward all the time: nor will they notice anything that is going forward as long as they continue in that state, which lasts for an hour or two at each time. By their always wishing to fly upwards, it may be supposed that, when they take their flight, they mount to a great height, so that they can direct their course the better by seeing the way clear all around them: their

CHAP. VII.

THE PARROT AND ITS AFFINITIES.

The Parrot is the best known among us of all foreign birds, as it unites the greatest beauty with the greatest docility. Its voice also is more like a man's than that of any other; the raven is too hoarse, and the jay and magpie too shrill, to resemble the truth; the parrot's note is of the true pitch, and capable of a number of modulations that even some of our orators might wish in vain to imitate.

(The Parrot.)

The ease with which this bird is taught to speak, and the great number of words which it is capable of repeating, are no less surprising. We are assured, by a grave writer, that one of these was taught to repeat a whole sonnet from Petrarch; and that I may not be wanting in my instance, I have seen a parrot, belonging to a distiller, who had suffered pretty largely in his circumstances from an informer who lived opposite him, very ridiculously employed. This bird was taught to pronounce the ninth commandment—"Thou shalt not bear false witness against thy neighbour," with a very clear, loud, articulate voice. The bird was generally placed in its cage over against the informer's house, and delighted the whole neighbourhood with its persevering exhortations.

Willughby tells a story of a parrot, which is not so dull as those usually brought up when this bird's facility of talking happens to be the subject:—"A parrot, belonging to Henry the Seventh, who then resided at Westminster, in his palace by the river Thames, had learned to talk many words from the passengers as they happened to take water. One day, sporting on its perch, the poor bird fell into the water, at the same time crying out, as loud as he could, 'A boat! twenty pound for a boat!' A waterman, who happened to be near, hearing the cry, made to the place where the parrot was floating, and taking him up restored him to the king. As it seems the bird was a favourite, the man insisted that he ought to have a reward rather equal to his services than his trouble; and, as the parrot had cried twenty pounds, he said, the king was bound in honour to grant it. The king at last agreed to leave it to the parrot's own determination, which the bird hearing, cried out, 'Give the knave a groat!'"*

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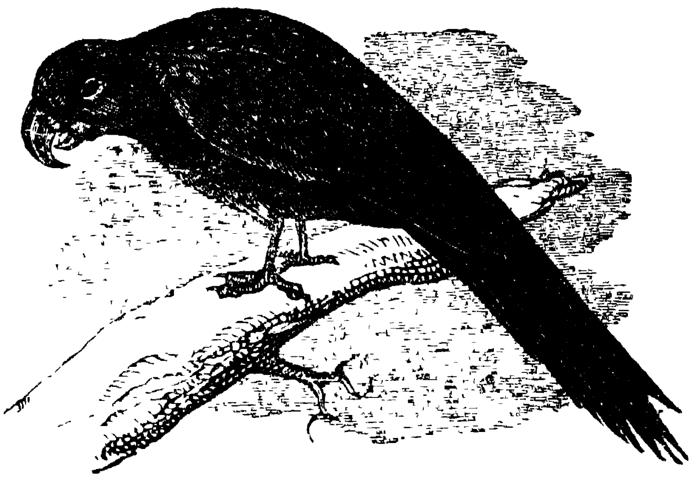
agitation generally lasts on them about a fortnight; sometimes more, and sometimes less: in the spring it seems strongest on them; at that season they will sometimes flutter about the whole of the night, and sleep a great part of the day.—Zoological Magazine.

* Articulation of the Parrot.—We must not consider the articulated voice of the parrot as a proof of the superiority of his intelligence over that of other animals, or of its analogy with our own. It is certainly true that the parrots exhibit the most perfect brain to be found among any of the feathered races.

The parrot, which is so common as a foreign bird with us is equally so, as an indigenous bird in the climates where it is produced. The forests swarm with them; and the rook is not better known with us than the parrot in almost every part of the East and West Indies. It is in vain that our naturalists have attempted to arrange the various species of this bird; new varieties daily offer to puzzle the system-maker, or to demonstrate the narrowness of his catalogues.

Those who usually bring these birds over are content to make three or four distinctions, to which they give names; and with these distinctions I will content myself also. The large kind, which are of the size of a raven, are called **Macaws**; the next size are simply called **Parrots**; those which are entirely white are called **Lories**; and the lesser size of all are called **Paroquets**. The difference between even these is rather in the size than in any other peculiar conformation, as they are all formed alike, having toes two before and two behind for climbing and holding; strong hooked bills for breaking open nuts, and other hard substances on which they feed; and loud, harsh voices, by which they fill their native woods with clamour.



(The Macaw.)

But there are further peculiarities in the conformation; and, first, their toes are contrived in a singular manner, which appears when they walk or climb, and when they are eating. For the first purpose, they stretch two of their toes forward and two backward; but when they take their meat, and bring it to their mouths with their foot, they dexterously and nimbly turn the greater hind toe forward, so as to take a firmer grasp of the nut or the fruit they are going to feed on, standing all the while upon the other leg. Nor even do they present their food in the usual manner; for other animals turn their meat inwards to the mouth, but these, in a seemingly awkward position, turn their meat outwards, and thus hold the hardest nuts as if in one hand, till with their bills they break the shell and extract the kernel.

The anterior lobes of its hemispheres are more prolonged than they are in rapacious birds, and the encephalon is wider and more flatted than long; but as to the intelligence of the bird, compared with ours, it can only be considered that there is a point of contact between them, as it were, but no resemblance. The parrot's imitation seems purely mechanical: it articulates words, indeed; but this cannot be deemed a true language. In the same manner as an air is taught to a linnet with a bird-organ, so a word is taught to a parrot, which he repeats without knowing wherefore. He does not comprehend its signification; and, though he may repeat it on certain occasions, because he has learned it, he sees no reason for doing so, like man. He utters, indifferently, a prayer or an insult; and those involuntary substitutions, which really prove his want of intelligence, pass, with unreflecting persons, for a mark of wit, of irony, or of some other quality of the mind, of which the animal is utterly destitute and incapable of acquiring.

There are two kinds of imitations—one which is altogether physical and dependent on similitude of organization; the other, the fruit of reflection, volition, and intelligence: the first is possessed by the ape and the parrot—the second by man alone; one requires nothing but memory, and an aptitude of organic functions—the other demands a profound study, like that of comedians and tragedians. A mere imitation of the exterior, such as a brute can give, is insufficient. The mind and soul must be moulded, as it were, on the model imitated: this requires a certain equiponderance of mental faculties which cannot exist between man and brute of any species.—Griffiths.

The bill is fashioned with still greater peculiarities; for the upper chap, as well as the lower, are both movable. In most other birds the upper chap is connected, and makes but one piece with the skull; but in these, and in one or two species of the feathered tribe more, the upper chap is connected to the bone of the head by a strong membrane, placed on each side, that lifts and depresses it at pleasure. By this contrivance they can open their bills the wider; which is not a little useful, as the upper chap is so hooked and so overhanging, that, if the lower chap only had motion, they could scarce gape sufficiently to take anything in for their nourishment.

The tongue of this bird somewhat resembles that of a man; for which reason, some pretend that it is so well qualified to imitate the human speech; but the organs by which these sounds are articulated lie farther down in the throat, being performed by the great motion which the os hyoides has in these birds above others.

The parrot, though common enough in Europe, will not, however, breed here.* The climate is too cold for its warm constitution; and though it bears our winter when arrived at maturity, yet it always seems sensible of its rigour, and loses both its spirit and appetite during the colder part of the season. It then becomes torpid and inactive, and seems quite changed from that bustling, loquacious animal which it appeared in its native forests, where it is almost ever upon the wing. Notwithstanding, the parrot lives even with us a considerable time, if it be properly attended to; and, indeed, it must be owned that it employs but too great a part of some people's attention.

Parrots lay two or three eggs, and probably the smaller kind may lay more; for it is a rule that universally holds through nature, that the smallest animals are always the most prolific; for being, from their natural weakness, more subject to devastation, Nature finds it necessary to replenish the species by superior fecundity. In general, however, the number of their eggs is stinted to two, like those of the pigeon, and they are about the same size. They are always marked with little specks, like those of a partridge; and some travellers assure us that they are always found in the trunks of the tallest, straightest, and the largest trees. The natives of these countries, who have little else to do, are very assiduous in spying out the places where the parrot is seen to nestle, and generally come with great joy to inform the Europeans, if there be any, of the discovery. As those birds have always the greatest docility that are taken young, such a nest is often considered as worth taking some trouble to be possessed of; and, for this purpose, the usual method of coming at the young, is by cutting down the tree. In the fall of the tree it often happens that the young parrots are killed; but if one of them survives the shock, it is considered as a sufficient recompense.

But it is not for the sake of their conversation alone that the parrot is sought after among the savages; for, though some of them are but tough and ill-tasted, yet there are other sorts, particularly of the small paroquet tribe, that are very delicate food. In general it obtains that, whatever fruit or grain these birds mostly feed upon, their flesh partakes of the flavour, and becomes good or ill tasted, according to the quality of their particular diet. When the guava is ripe, they are at that season fat and tender; if they feed upon the seed of the acajou, their flesh contracts an agreeable flavour of garlic; if they feed upon the seed of the spicy trees, their flesh then tastes of cloves and cinnamon; while, on the contrary, it is insupportably bitter if the berries they feed on are of that quality. The seed of the cotton-tree intoxicates them in the same manner as wine does man; and even wine itself is drunk by parrots, as Aristotle assures us, by which they are thus rendered more talkative and amusing. But of all food, they are fondest of the carthamus, or bastard saffron; which, though strongly purgative to man, agrees perfectly with their constitution, and fattens them in a very short time.[*]

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* Reproduction.—It was for a long time imagined that these birds could procreate in their native country only. Many parrots, however, were born in Europe as far back as 1740 and 1741. In 1801 some Amazon parrots were born at Rome. M. Lamoroux has given us considerable details respecting the broods of blue macaws that were at Caen some years ago. These birds, in four years and a half, from the month of March, 1818, to the end of August, 1822, laid sixty-two eggs in nineteen broods. Of this number, twenty-five eggs produced young ones, of which ten only died. The others lived and became perfectly accustomed to the climate. They laid eggs at all seasons, and the broods became more frequent and more productive in the course of time, and in the end much fewer were lost.

But, though there are so many motives for destroying these beautiful birds, they are in very great plenty; and in some countries on the coast of Guinea, they are considered by the negroes as their greatest tormentors. The flocks of parrots persecute them with their unceasing screaming, and devour whatever fruits they attempt to produce by art in their little gardens. In other places they are not so destructive, but sufficiently common; and, indeed, there is scarce a country of the tropical climates that has not many of the common kinds as well as some peculiarly its own. Travellers have counted more than a hundred different kinds on the continent of Africa only. There is one country, in particular, north of the Cape of Good Hope, which takes its name from the multitude of parrots which are seen in its woods. There are white parrots seen in the burning regions of Ethiopia; in the East Indies they are of the largest size; in South America they are docile and talkative; in all the islands of the Pacific Sea and the Indian Ocean they swarm in great variety and abundance, and add to the splendour of those woods which Nature has dressed in eternal green.

So generally are these birds known at present, and so great is their variety, that nothing seems more extraordinary than that there was but one sort of them known among the ancients, and that at a time when they pretended to be masters of the world. If nothing else could serve to show the vanity of a Roman's boast, the parrot tribe might be an instance, of which there are a hundred kinds now known, not one of which naturally breeds in the countries that acknowledged the Roman power. The green paroquet, with a red neck, was the first of this kind that was brought into Europe, and the only one that was known to the ancients from the time of Alexander the Great to the age of Nero.[†] This was brought from India; and when afterwards the Romans began to seek and rummage through all their dominions for new and unheard of luxuries, they at last found out others in Gaganda, an island of Ethiopia, which they considered as an extrordinary discovery.

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[*] Food.—In domestication, the parrots, macaws, paroquets, and cockatoos, show the same partiality for vegetable seeds, and, in general, are fed very well on hemp-seed, the skins or husks of which they detach with wonderful address. Some that receive bones to gnaw are known to acquire a very determined taste for animal substances, but especially for the tendons, ligaments, and other less succulent parts. From feeding thus, some parrots contract the habit of plucking out their own feathers that they may suck the stem; and this becomes so imperious a want with them, that they strip their bodies absolutely naked, not leaving a vestige of down wherever the bill can reach. They spare, however, the quills of the wings and tail, the plucking of which would cause them too much pain. M. Desmarest mentions an instance of one of these birds, belonging to M. Latreille, the body of which thus became as naked as that of a pullet plucked for roasting. This bird, notwithstanding, supported the rigour of two very severe winters, without the slightest alteration of health or appetite. M. Vieillot observes that this habit of deplumation is produced in many parrots by an itching of the skin, and not in consequence of their being accustomed to eat animal substances.—Ed.

[†] Parrots in Ancient Times.—The ancients were acquainted with several parrots, among which the most celebrated was that sent from India by Alexander, in the course of his expedition to that country. Mr Vigors, who has written on a group of Psittacidæ known to the ancients, and has treated the subject with his accustomed elegance of style, methodical discrimination, and profound classical research, tells us that "the ancient writers are unanimous in informing us that the parrots known to their times came exclusively from India. In that country these birds were ever held in the highest estimation. We are informed by Ælian that they were the favourite inmates of the palaces of the princes, and were looked up to as objects of sacred reverence by the religious feelings of the people. From thence they were introduced into Europe at the time of the Macedonian conquest; and the specific name of *Alexandri*, applied by modern science to the type of the group, in honour of the first European discoverer of it, serves to perpetuate the name

Parrots have usually the same disorders with other birds; and they have one or two peculiar to their kind. They are sometimes struck by a kind of apoplectic blow, by which they fall from their perches, and for awhile seem ready to expire. The other is the growing of the beak, which becomes so very much hooked as to deprive them of the power of eating. These infirmities, however, do not hinder them from being long-lived; for a parrot well kept will live five or six and twenty years.*

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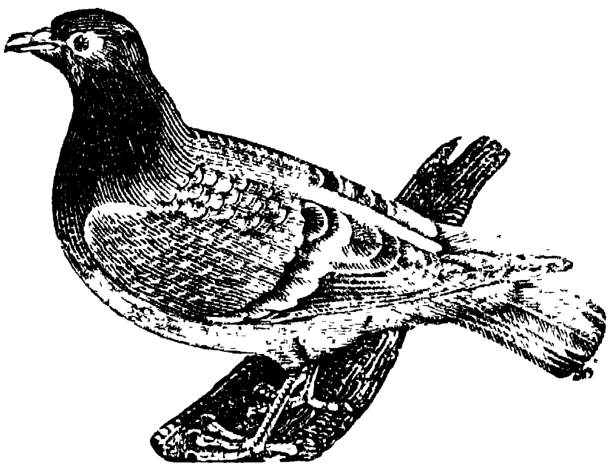
of a warrior who is said to have valued the conquests that extended the boundaries of his empire, chiefly as they served to extend the boundaries of science. It was not until the time of Nero that the parrots of Africa became known to the Romans. Some of these birds were among the discoveries made in the course of an expedition sent out by that prince. They came apparently from the neighbourhood of the Red Sea; and it is probable that, as that country became more known, numbers of the same race were imported from it into Rome, and formed the chief part of those victims of the *parrot* tribes, which, in after times, are said to have supplied the inordinate luxury and wantonness of Heliogobalus."—Zoological Journal.

* Love Birds.—We are favoured with the following interesting paper by a gentleman who is much devoted to ornithological pursuits.—Ed.

"These birds are the smallest of the parrot tribe; their face is red, and the tail orange-red, crossed by a black bar. They are natives of Guinea, and are also found in Ethiopia, Java, and the East Indies. The vessels trading from Guinea seldom fail to bring a considerable quantity of them in cages. Unfortunately they are so delicate that most of them die in their passage to our colder climate. It has also been observed that the firing of a vessel's great guns is fatal to many of them: they drop down dead with fear. Although they are very imitative of the manners of other birds, it is difficult to teach them to articulate words. They are extremely kind and affectionate to each other; the male usually sits on the same perch with the female. Whenever one descends for food, the other always follows; when their hunger is satisfied, they then return together. I shall endeavour to give you a slight sketch of the attachment these birds have to one another. I knew two that had lived four years together. The female became languid; her legs swelled, as if symptomatic of gout. It was no longer possible for her to descend and take her food as formerly; but the male assiduously brought it to her, carrying it in his bill and delivering it into hers: he continued to feed her in this manner for four months. The infirmities of his mate, however, increased every day; so that at length she was no longer able to sit upon her perch, but remained crouched at the bottom, making from time to time a few fruitless efforts to regain her perch,—while the male, who remained close by her, seconded her feeble attempts with all his power, sometimes seizing with his bill the upper part of her wing, sometimes taking hold of her bill and attempting to take her up, repeating his efforts several times. His countenance, his gestures, his continual solicitude, indicated in this most affectionate bird the most ardent desire to aid the weakness and to alleviate the sufferings of his companion. But the scene became still more interesting when the female was on the point of expiring. Her unfortunate partner then went round and round her without ceasing; he redoubled his assiduities and his tender cares; he attempted to open her bill in order to give her some nourishment; he went to her and returned with the most agitated air and with the utmost inquietude. At intervals, he uttered the most sorrowful cries; while, at other times, with his eyes rivetted upon her, he preserved a sorrowful silence. His faithful companion at length ceased to breathe, and from that time he languished and died in a few weeks.—G. H. Garnett.

CHAP. VIII.

THE PIGEON AND ITS VARIETIES.



(The Pigeon.)

THIS is one of the birds which, from its great fecundity, we have, in some measure, reclaimed from a state of nature, and taught to live in habits of dependence. Indeed, its fecundity seems to be increased by human cultivation, since those pigeons that live in a wild state, in the woods, are by no means so fruitful as those in our pigeon-houses nearer home. The power of increase in most birds depends upon the quantity of their food; and it is seen, in more than one instance, that man, by supplying food in plenty, and allowing the animal at the same time a proper share of freedom, has brought some of those kinds, which are known to lay but once a year, to become much more prolific.

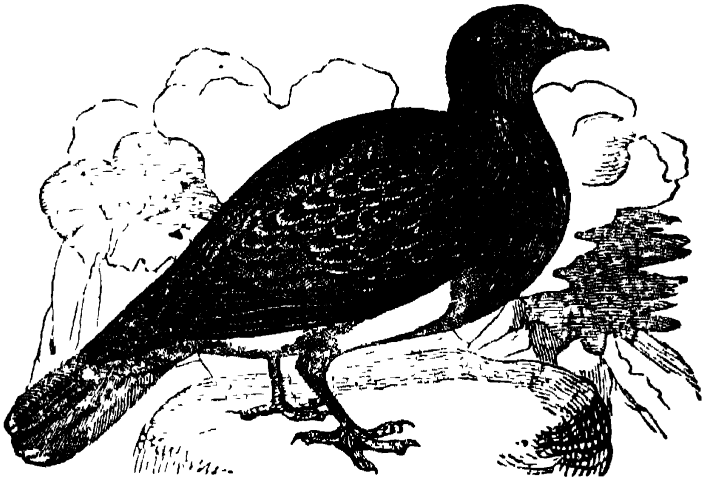
The TAME PIGEON, and all its beautiful varieties, derive their origin from one species, the Stock Dove only, the English name, implying its being the stock or stem from whence the other domestic kinds have been propagated. This bird, in its natural state, is of a deep-bluish ash colour; the breast dashed with a fine changeable green and purple; its wings marked with two black bars; the back white, and the tail barred near the end with black. These are the colours of the pigeon in a state of nature; and from these simple tints has man, by art, propagated a variety that words cannot describe, nor even fancy suggest. However, nature still perseveres in her great outline; and though the form, colour, and even the fecundity of these birds may be altered by art, yet their natural manners and inclinations continue still the same.

The STOCK-DOVE, in its native woods, differs from the ring-dove, a bird that has never been reclaimed, by its breeding in the holes of rocks and the hollows of trees. All other birds of the pigeon kind build like rooks, in the topmost branches of the forest, and choose their habitation as remote as possible from man. But this species soon takes to build in artificial cavities; and, from the temptation of a ready provision and numerous society, easily submits to the tyranny of man. Still, however, it preserves its native colour for several generations, and becomes more variegated only in proportion as it removes from the original simplicity of its colouring in the woods.

The DOVE-HOUSE PIGEON, as is well known, breeds every month; but then it is necessary to supply it with food when the weather is severe, or the fields are covered with snow. Upon other occasions, it may be left to provide for itself; and it generally repays the owner for his protection. The pigeon lays two white eggs, which most usually produce young ones of different sexes. For the laying of each egg, it is necessary to have a particular congress with the male; and the egg is usually deposited in the afternoon. When the eggs are thus laid, the female, in the space of fifteen days, not including the three days during which she is employed in laying, continues to hatch, relieved at intervals by the male. The turns are usually regulated with great exactness. From three or four o'clock in the evening, till nine the next day, the female continues to sit; she is then relieved by the male, who takes his place from ten till three, while his mate is feeding abroad. (In this manner they sit alternately till the young are excluded. If, during this term, the female delays to return at the expected time, the male follows and drives her to the nest; and, should he in his turn be dilatory, she retaliates with equal severity.

The young ones when hatched require no food for the three first days, only wanting to be kept warm, which is an employment the female takes entirely upon herself. During this period, she never stirs out, except for a few minutes to take a little food. From this they are fed for eight or ten days with corn or grain of different kinds, which the old ones gather in the fields, and keep treasured up in their crops, from whence they throw it up again into the mouths of their young ones, who very greedily demand it.

The fidelity of the Turtle Dove is proverbial, and makes the usual comparison of such poets as are content to repeat what others have said before them; but the pigeon of the dove-house is not so faithful; and, having been subjected to man, it puts on licentiousness among its other domestic habits. Two males are often seen quarrelling for the same mistress; and when the female admits the addresses of a new gallant, her old companion seems to bear the contempt with some marks of displeasure, abstains from her company, or if he approaches, it is only to chastise her. There have been instances when two males, being displeased with their respective mates, have thought proper to make an exchange, and have lived in great harmony with their new companions.*


(The Turtle Dove.)

So great is the produce of this bird in its domestic state, that near fifteen thousand may, in the space of four years, be produced from a single pair. But the stock-dove seldom breeds above twice a year; for, when the winter months come, the whole employment of the fond couple is rather for self-preservation than transmitting a posterity. They seem, however, to have a stronger attachment to their young than those who are found to breed so often; whether it be that instinct acts more powerfully upon them in their state of nature, or that their affections are less divided by the multiplicity of claims.

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* The Turtle Dove.—This is a favourite bird with all those who love to wander among the woods in spring, and listen to their varied harmony. They will there hear many a singular and sprightly performer, but none so mournful as this. The hopeless woe of settled sorrow, swelling the heart of female innocence itself, could not assume tones more sad, more tender, and affecting. Its notes are four: the first is somewhat the highest, and preparatory, seeming to be uttered with an inspiration of the breath, as if the afflicted creature were just recovering its voice from the last convulsive throbs of distress; this is followed by three long, deep, and mournful moanings, that no person of sensibility can listen to without sympathy. There is, however, nothing of real distress in all this; quite the reverse. The bird who utters it wantons by the side of his beloved partner, or invites her by his call to some favourite, retired and shady retreat. It is the voice of love—of faithful connubial affection—for which the whole family of doves are so celebrated; and, among them all, none more deservingly so than the species now before us.

It is from a species of these, therefore, that those pigeons which are called carriers, and are used to convey letters, are produced. These are easily distinguished from all others by their eyes, which are compassed about with a broad circle of naked, white skin, and by being of a dark blue or blackish colour. It is from their attachment to their native place, and particularly where they have brought up their young, that these birds are employed in several countries as the most expeditious carriers. They are first brought from the place where they were bred, and whither it is intended to send them back with information. The letter is tied under the bird's wing, and it is then let loose to return. The little animal no sooner finds itself at liberty, than its passion for its native spot directs all its motions. It is seen, upon these occasions, flying directly into the clouds to an amazing height; and then, with the greatest certainty and exactness, directing itself, by some surprising instinct, towards home, which lies sometimes at many miles distance, bringing its message to those to whom it is directed. By what marks they discover the place, by what chart they are guided in the right way, is to us utterly unknown; certain it is that, in the space of an hour and a half, they perform a journey of forty miles; which is a degree of despatch three times greater than the fleetest quadruped can perform.[*]

The varieties of the tame pigeon are so numerous that it would be a vain attempt to mention them. So much is the figure and the colour of this bird under human control, that pigeon-fanciers, by coupling a male and female of different sorts, can breed them, as they express it, to a feather. From hence we have the various names of Croppers, Carriers, Jacobines, Powters, Runts, and Turbits: all birds that at first might have accidentally varied from the stock-dove, and then, by having these varieties still heightened by food, climate, and pairing, different species have been produced. But there are many species of the wild pigeon which, though bearing a strong affinity to the stock-dove, are, nevertheless, sufficiently different from it to deserve a distinct description. The Ring-dove is of this number; a good deal larger than the former, and building its nest with a few dry sticks in the boughs of trees. This seems a bird much fonder of its native freedom than the former, and attempts have been frequently made to render it domestic, but they have hitherto proved fruitless; for though their eggs have been hatched by the tame pigeon in a dove-house, yet, as soon as they could fly, they always betook themselves to the woods where they were first produced. In the beginning of winter these assemble in great flocks in the woods, and leave off cooing; nor do they resume this note of courtship till the beginning of March, when the genial season, by supplying them with food, renews their desires

The turtle dove is a smaller, but a much shyer, bird than any of the former. It may easily be distinguished from the rest by the iris of the eye, which is of a fine yellow, and by a beautiful crimson circle that encompasses the eyelids. The fidelity of these birds is noted; and a pair being put in a cage, if one dies, the other will not survive it. The turtle-dove is a bird of passage, and few or none remain in our northern climates in winter. They fly in flocks when they come to breed here in summer, and delight in open, mountainous, sandy countries. But they build their nests in the midst of woods, and choose the most retired situations for incubation. They feed upon all sorts of grain, but are fondest of millet-seed.[†]

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[*] Speed of the Carrier Pigeon.—Mr. Audubon says he has shot the passenger pigeon of America (*Columba migratoria*) during his hunting excursions through the forests; and, on dissection, found its stomach full of fresh rice, which, to have resisted the digestive process, must have been swallowed not many hours preceding its death, but could not have been obtained within eight hundred miles of the place where it was killed.

[†] Migration of Birds.[‡]—The other bird we would notice is one which makes our island, in common with the temperate parts of Europe, its breeding-place and summer

[‡] See note on "Migration," in the History of the Stork, which follows.—Ed.

To this short list might be added a long catalogue of foreign pigeons, of which we know little more than the plumage and the names; indeed, the variety of their plumage is as beautiful as the names by which they are known are harsh

abode: it is a bird whose voice makes glad the groves, harmonizing with the soft breathings of spring and the aspect of reviving nature; a bird which, by universal consent, has been taken as the emblem of concord, love, and domestic happiness: we allude to the turtle dove, the theme of poets in every age. "For, lo, the winter is past, the rain is over and gone; the time of the singing of birds is come, and the voice of the turtle is heard in our land."—*Solomon's Song*, ii. 11, 12.

The turtle dove (*Columba turtur*) is not insectivorous, nor does it, like the stork, feed upon frogs, lizards, or fish; its food is grain, leguminous seeds, and berries, with the tender leaves of plants. Arriving in April, it departs in September or the beginning of October, passing southwards, most probably wintering in the north of Africa. From its lengthened, pointed wing, few birds possess better powers of flight. Leaving these selected examples, and again reverting to the phenomena of migration, whither, we may inquire, do all our summer visiters retire, on leaving the temperate latitudes of Europe? All follow the mighty stream southwards; some stop short on the confines of Europe; some penetrate into the adjacent parts of Asia; but more, we suspect, find in Africa, ever teeming with insect tribes, an asylum, till warned, in some inexplicable way, that it is time for them to wing back their northward flight. Their visit to our shores depends, however, on the weather, which appears to hasten or retard their progress, as the season may happen to be; and hence it often occurs, that a few, taking advantage of a favourable opportunity, arrive days before the main body, which is kept back by a sudden return of bad weather; thus verifying the old adage, "One swallow does not make a summer."

We have hitherto spoken only of our summer visiters, and their departure; it remains for us to notice those whose native habitation is in the region of the arctic circle, among morasses and forests, which afford during summer an abundance of food, and every advantage in the rearing of their young. When winter (which sets in early there) begins to bind up the lakes and surface of the earth, these depart southwards, arriving in our latitudes as our summer birds are departing, but not to fill their place; theirs is not the voice of song; or if in some few instances it be, it is mute, for food only is the object of their visit to our comparatively milder shores, which they leave for their native regions again with the return of spring, called away by the same impulse that calls the warblers here. Our winter guests, if not prized for their song, are, however, of no mean value; many, indeed, are esteemed as the greatest luxuries of the table; witness, for example, the redwing, (*Turdus iliacus*, L.) the field-fare, (*Turdus pilaris*, L.) the woodcock, the snipe, the widgeon, &c; to which, though not used as food, may be added the goosander, (*Mergus merganser*, L.) the smew, (*Mergus albellus*, L.) and of small birds, the grosbeak, crossbill, and Bohemian wax-wing, besides many others. The food which our winter visiters seek is of two kinds—the one afforded by our open lakes, rivers, sea-shores, and inland morasses, such as small fish, moluscous animals, insects buried in the mud, and the leaves or roots of aquatic plants; the other, the produce of our woods and hedges, namely, winter fruits and berries, such as the haw, the acorn, the sloe, &c.

The migration of most, if not all our winter birds of passage, takes place during the night—at least, such is the case with the snipe and woodcock, the fieldfare and redwing: as a rule, it may therefore be considered universal.

One point before we close remains to be noticed, namely the power which birds possess for performing such extensive journeys. The flight of birds may be estimated from fifty to one hundred and fifty miles an hour; and, taking the mean of this as a rate for the migratory species in general, we shall find them endowed with powers fully adequate for the most extensive journey. It is, however, very probable that most perform the work by short stages of a few hours' flight, resting and recruiting in some convenient situation, and resuming their journey again. Few, perhaps, cross the main expanse of ocean, but take it at its narrowest portions, as the channel between France and England (where, midway, the author saw a bee skimming with the utmost unconcern over the rolling waves), the Mediterranean, &c; many pursuing their route across the continent; others perhaps coasting the western shores of Europe, or passing over the Bay of Biscay across Spain and Portugal, and reaching Africa by the Straits of Gibraltar. In short, there is nothing very extraordinary in the performance itself; the mystery lies in the motives which lead to it, and the instinct which impels and guides these winged tenants of the air in their destined course. Many points yet remain to be cleared up; but in and dissonant. The Ocotzimtzcan, for instance, is one of the most splendid tenants of the Mexican forests; but few, I believe, would desire to learn the name, only to be informed that it is covered with purple, green, and yellow plumage. To describe such birds, the historian's pen is not half such an useful implement as the painter's pencil.*

the present case, our very ignorance, as well as our knowledge, leads us to the great Cause of causes, who not only guides the bird in the migration he has appointed it to take, but the globe itself in its circuit in the heavens, and the moon and the stars in their courses. Let His be all the praise.

* THE WILD PIGEON OF AMERICA.—On Feb 19, 1827, an interesting paper, on the habits of the wild pigeon of America, was read before the Royal Society of Edinburgh, by J J Audubon, Esq

The most important facts connected with the habits of these birds relate to their extraordinary associations and migrations. No other species known to naturalists is more calculated to attract the attention of either the citizen or the stranger, as he has opportunities of viewing both of these characteristic habits while they are passing from north to south, east and west, and *vice versa*, over and across the whole extent of the United States of America.

Their great power of flight enables them when in need, to survey and pass over an astonishing extent of country in a very short time. This is proved by facts known to the greater number of observers in America. Pigeons, for example have been killed in the neighbourhood of New York, with their crops still filled with rice, collected by them in the fields of Georgia and Carolina, the nearest point at which this supply could possibly have been obtained; and as it is well ascertained that, owing to their great power of digestion, they will decompose food entirely in twelve hours, they must have travelled between three hundred and four hundred miles in six hours, making their speed at an average of about one mile in a minute, and this would enable one of these birds, if so inclined, to visit the European continent, as swallows undoubtedly are able to do, in a couple of days

Their multitudes in our woods are astonishing; and, indeed, after having viewed them so often, and under so many circumstances, for years, and, I may add, in many different climates, I even now feel inclined to pause, and assure myself afresh that what I am going to relate is fact. That I have seen it is most certain; and I have seen it all in the company of hundreds of other persons looking on, like myself, amazed, and wondering if what we saw was really true.

In the autumn of 1813, I left my house at Henderson, on the banks of the Ohio, on my way to Louisville Having met the pigeons flying from north-east to south-west, in the barrens or natural wastes a few miles beyond Hardensburgh, in greater apparent numbers than I thought I had ever seen them before, I felt an inclination to enumerate the flocks that would pass within the reach of my eye in one hour. I dismounted, and, seating myself on a tolerable eminence, took my pencil to mark down what I saw going by and over me, and made a dot for every flock which passed!

Finding, however, that this was next to impossible, and feeling unable to record the flocks, as they multiplied constantly, I rose, and counting the dots then put down, discovered that a hundred and sixty-three had been made in twenty-one minutes. I travelled on, and still met more the farther I went. The air was literally filled with pigeons; the light of noon-day became dim, as during an eclipse; the pigeons' dung fell in spots, not unlike melting flakes of snow; and the continued buzz of their wings over me had a tendency to incline my senses to repose

Whilst waiting for my dinner at Young's Inn, at the confluence of Salt River with the Ohio, I saw, at my leisure immense legions still going by, with a front reaching far beyond the Ohio on the west, and the beech wood forests directly on the east of me. Yet not a single bird would alight; for not a nut or acorn was that year to be seen in the neighbourhood They consequently flew so high, that different trials to reach them with a capital rifle proved ineffectual, and not even the report disturbed them in the least. But I cannot describe how beautiful their aërial evolutions were if a black hawk appeared in their rear. At once, like a torrent, and with a thunder-like noise, they formed themselves into almost a solid compact mass, pressing each on each towards the centre; and when in such solid bodies they zig-zagged to escape the murderous falcon, now down close over the earth, sweeping with inconceivable velocity, then ascending perpendicularly, like a vast monument, and when high were seen wheeling and twisting within their continued lines, resembling the coils of a gigantic serpent.

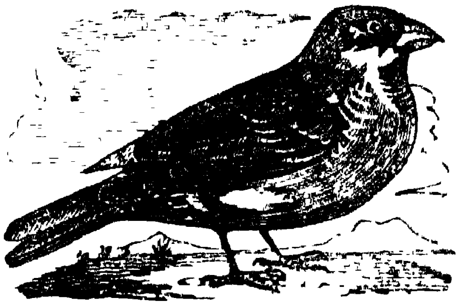
Before sunset I reached Louisville, distant from Hardensburgh fifty-five miles, where the pigeons were still passing; and this continued for three days in succession.

CHAP. I.

BIRDS OF THE SPARROW KIND IN GENERAL.

STILL descending from the larger to the smaller, we come to birds of the sparrow kind; or that class of beautiful little animals that, being less than the pigeon, go on diminishing till we arrive at the humming bird, the smallest of the feathered creation.

The birds which compose this class chiefly live in the neighbourhood of man, and are his greatest favourites. The falcon may be more esteemed, and the turkey more useful; but these he considers as servants, not as friends; as animals reclaimed merely to supply him with some of the conveniences of life: but these little painted songsters have his affections, as well from their beauty as their melody; it is this delightful class that fill his groves with harmony, and lift his heart to sympathize with their


(The Sparrow.)

The people were indeed all up in arms, and shooting on all sides at the passing flocks. The banks of the river were crowded with men and children, for here the pigeons flew rather low as they passed the Ohio. This gave a fair opportunity to destroy them in great numbers. For a week or more the population spoke of nothing but pigeons, and fed on no other flesh but that of pigeons. The whole atmosphere during this time was strongly impregnated with the smell appertaining to their species.

It may not, perhaps, be out of place to attempt an estimate of the number of pigeons contained in one of those mighty flocks, and the quantity of food daily consumed by its members. The inquiry will show the astonishing bounty of the Creator in his works, and how universally this bounty has been granted to every living thing on that vast continent of America.

We shall take, for example, a column of one mile in breadth, which is far below the average size, and suppose it passing over us without interruption for three hours, at the rate mentioned above, of one mile per minute. This will give us a parallelogram of one hundred and eighty miles by one, covering one hundred and eighty square miles, and allowing two pigeons to the square yard, we have one billion one hundred and fifteen millions one hundred and thirty-six thousand pigeons in one flock; and as every pigeon consumes fully half a pint of food per day, the quantity must be eight millions seven hundred and twelve thousand bushels per day which is required to feed such a flock.—ARCANA OF SCIENCE, 1828.

MODE OF DECOYING WILD PIGEONS IN NEW ENGLAND.—The flight and stool pigeons, as they are called, are prepared by passing a thread through the edges of both their eyelids, which are thus closed; their legs are booted, and the flights, being fastened to long strings, are thrown into the air, and fly as far as they are permitted;—while the stool pigeon is tied to a narrow board, which, at the end where the bird is fixed, rises and falls; and both kinds of decoy, by the flapping of their wings, draw the attention of the passing flocks of wild pigeons, which are thus made to alight on prepared ground, within reach of the concealed spring-net, or on a long pole rising a little from the horizontal line, so as to give the greatest effect to the discharge of the gun from the bush-house which conceals the sportsman. The net, concealed by cut grass, is sprung by a rope, which is pulled at the moment after the pigeons alight upon the prepared ground.—ARCANA OF SCIENCE, 1833.

raptures. All the other classes are either mute or screaming; it is this diminutive tribe only that have voices equal to the beauty of their figures; equally adapted to rejoice man, and delight each other.

As they are the favourites of man, so they are chiefly seen near him. All the great birds dread his vicinity, and keep to the thickest darkness of the forest, or the brow of the most craggy precipice; but these seldom resort to the thicker parts of the wood; they keep near its hedges, in the neighbourhood of cultivated fields; in the hedge-rows of farm-grounds; and even in the yard, mixing with the poultry.*

It must be owned, indeed, that their living near man is not a society of affection on their part, as they approach inhabited grounds merely because their chief provision is to be found there. There is still another reason for these little birds avoiding the depths of the forest; which is, that their most formidable enemies usually reside there. The greater birds, like robbers, choose the most dreary solitudes for their retreats: and if they do not find, they make a desert all around them. The small birds fly from their tyranny, and take protection in the vicinity of man, where they know their more unmerciful foes will not venture to pursue them.

All birds, even those of passage, seem content with a certain district to provide food and centre in. The redbreast or the wren seldom leaves the field where it has been brought up, or where its young have been excluded; even though hunted it flies along the hedge, and seems fond of the place with an imprudent perseverance. The fact is, all these small birds mark out a territory to themselves, which they will permit none of their own species to remain in;

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* THE SPARROW.—We have no bird more generally known, thought of, mentioned with greater indifference—perhaps contempt, than the common sparrow, (*fringilla domestica.*) "that sitteth alone on the house-top;" yet it is an animal that nature seems to have endowed with peculiar characteristics, having ordained for it a very marked provision, manifested in its increase and maintenance, notwithstanding the hostile attacks to which it is exposed. A dispensation that exists throughout creation is brought more immediately to our notice by the domestic habits of this bird. The natural tendency that the sparrow has to increase will often enable one pair of birds to bring up fourteen or more young ones in a season. They build in places of perfect security from the plunder of larger birds, or vermin. Their art and ingenuity in commonly attaching their nests beneath that of the rook, high in the elm—a bird whose habits are perfectly dissimilar, and with which they have no association whatever, making use of their structure only for a defence, to which no other bird resorts—manifest their anxiety and contrivance for the safety of their broods. With peculiar perseverance and boldness, they forage and provide for themselves and their offspring; will filch grain from the trough of the pig, or contend for its food with the gigantic turkey; and, if scared away, their fears are those of a moment, as they quickly return to their plunder; and they roost protected from all injuries of the weather. These circumstances tend greatly to increase the race; and in some seasons the number in our corn fields towards autumn are prodigious; and did not events counteract the increase of this army of plunderers, the larger portion of our bread-corn would be consumed by them. But their reduction is as rapidly accomplished as their increase, their love of association bringing upon them a destruction which a contrary habit would not tempt. They roost in troops on our ricks, in the ivy on the wall, &c., and are captured by the net They cluster on the bush, or crowd on the chaff by the barn door, and are shot by dozens at a time, or will rush in numbers, one following another, into the trap. These, and various other engines of destruction, so reduce them in the winter season, that the swarms of autumn gradually diminish, till their numbers in spring are no way remarkable.

We have scarcely another bird, the appetite of which is so accommodating in all respects as that of the house sparrow: it is, I believe, the only bird that is a voluntary inhabitant with man—lives in his society, and is his constant attendant, following him wherever he fixes his residence. It becomes immediately an inhabitant of the new farm-house, in a lonely place or recent inclosure, or even in an island; will accompany him into the crowded city, and build and feed there in content, unmindful of the noise, the smoke of the furnace, or the steam-engine, where even the swallow and marten, that flock around him in the country, are scared by the tumult and leave him. It is not known in a solitary and independent state.

they guard their dominions with the most watchful resentment, and we seldom find two male tenants in the same hedge together.

Thus, though fitted by nature for the most wandering life, these little animals do not make such distant excursions, during the season of their stay, as the stag or the leveret. Food seems to be the only object that puts them in motion; and when that is provided for them in sufficient plenty they never wander. But as that is seldom permanent through the year, almost every bird is then obliged to change its abode. Some are called birds of passage, because they are obliged to take long journeys for this purpose; but, strictly speaking, almost every other kind are birds of passage, though their migration may not be to places so remote. At some particular season of the year, all small birds migrate either from one county to another, or from the more inland provinces towards the shore.

Singing among birds is almost universally the prerogative of the male. With them it is the reverse of what occurs in the human kind. Among the feathered tribe, the heaviest cares of life fall to the lot of the female. Hers is the fatigue of incubation, and to her devolves the principal fatigue of nursing the helpless brood. To alleviate these fatigues, and to support her under them, nature has given the song to the male. This serves as a note of blandishment at first to attract her affections; it serves as a note to delight her during the time of her incubation; but it serves still farther as a note of security, to assure her that no danger threatens to molest her. The male, while his mate is hatching, sits upon some neighbouring tree, continuing at once to watch and to sing. While his voice is heard, the female rests in confident security; and as the poet expresses it, appears *most blest when most unseen;* but if any appearance of danger offers to intrude, the male, that a moment before was so loud and sportive, stops all of a sudden; and this is a most certain signal to his mate to provide for her own security.

The nest of little birds seems to be of a more delicate contrivance than that of the larger kinds. As the volume of their bodies is smaller, the materials of which their nests are composed are generally warmer. It is easy to conceive that small things keep heat a shorter time than those that are large. The eggs, therefore, of small birds require a place of more constant warmth than those of great ones, as being liable to cool more quickly; and accordingly their nests are built warmer and deeper, lined on the inside with softer substances, and guarded above with a better covering. But it sometimes happens that the little architects are disturbed in their operations, and then they are obliged to make a nest, not such as they wish, but such as they can. The bird, whose nest has been robbed several times, builds up her last in a very slovenly manner, conscious that, from the near approach of winter, she must not take time to give her habitation every possible advantage it is capable of receiving. When the nest is finished, nothing can exceed the cunning which the male and female employ to conceal it. If it is built in bushes, the pliant branches are so disposed as to hide it entirely from the view; if it be built among moss, nothing outwardly appears to show that there is an habitation within. It is always built near those places where food is found in greatest abundance; and they take care never to go in or out while there is any one in sight. The greater birds continue from their nest for some time, as their eggs take no damage in their absence; but the little birds are assiduous while they sit, and the nest is always occupied by the male when the female is obliged to seek for sustenance.

The first food of all birds of the sparrow kind is worms and insects. Even the sparrow and the goldfinch, that when adult feed only upon grain, have both been fed upon insects while in the nest. The young ones, for some time after their exclusion from the shell, require no food; but the parent soon finds by their chirping and gaping that they begin to feel the approaches of hunger, and flies to provide them a plentiful supply. In her absence they continue to lie close together, and cherish each other by their mutual warmth. During this interval also, they preserve a perfect silence, uttering not the slightest note till the parent returns. Her arrival is always announced by a chirrup, which they perfectly understand, and which they answer all together, each petitioning for its portion. The parent distributes a supply to each by turns, cautiously avoiding to gorge them, but to give them often though little at a time. The wren will in this manner feed seventeen or eighteen young ones, without passing over one of them.

Such is the manner in which these birds bring forth and hatch their young; but it yet remains to usher them from the nest into life, and this they very assiduously perform. When they are fully fledged, and fitted for short flights, the old ones, if the weather be fair, lead them a few yards from the nest, and then compel them to return.* For two or three succeeding days they are led out in the same manner, but each day to seek more distant adventures. When it is perceived that they can fly, and shift for themselves, then the parents forsake them for ever, and pay them no more attention than they do to other birds in the same flock. Indeed, it would seem among these little animals that, from the moment their young are set out, all future connexion ceases between the male and female; they go separate ways, each to provide for itself, during the rigours of winter; and, at the approach of spring, each seeks for a new associate.

Willughby has divided all the smaller birds into those that have slender bills, and those that have short and thick bills. Those with slender bills chiefly live upon insects; those with short, strong bills, live mostly upon fruits and grain. Among slender billed birds, he enumerates the thrush, the blackbird, the fieldfare, the starling, the lark, the titmouse, the water-wagtail, the nightingale, the redstart, the robin redbreast, the beccafigo, the stone-chatter, the whinchat, the goldfinch, the whitethroat, the hedge sparrow, the pettichaps, the golden-crowned wren,† the wren, the humming-bird, and several other small birds of the sparrow kind, unknown in this part of the world.

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* **Affection of Sparrows.**—"When I was a boy, I carried off a nest of young sparrows, about a mile from my place of residence. After the nest was completely moved, and while I was marching home with them in triumph, I perceived with some degree of astonishment, both the parents following me at some distance, and observing my motions in perfect silence. A thought then struck me, that they might follow me home, and feed the young according to their usual manner. When just entering the door, I held up the nest, and made the young ones utter the cry which is expressive of the desire of food. I immediately put the nest and the young in the corner of a wire cage, and placed it on the outside of a window. In a short time, both parents, having their bills filled with small caterpillars, came to the cage, and after chatting a little, gave a small worm to each. This parental intercourse continued regularly for some time, till the young ones were completely fledged, and had acquired a considerable degree of strength. I then took one of the strongest of them, and placed him on the outside of the cage, in order to observe the conduct of the parents after one of their offspring was emancipated. In a few minutes both parents, as usual, arrived, loaded with food. They no sooner perceived that one of their children had escaped from prison, than they fluttered about, and made a thousand noisy demonstrations of joy. These tumultuous expressions at last gave place to a more calm and worthy conversation. By their voices and their movements, it was evident that they earnestly entreated him to follow them, and to fly from his present dangerous state. He seemed to be impatient to obey their mandates; but by his gestures and the feeble sounds he uttered, he plainly expressed that he was afraid to try an exertion he had never before attempted. They, however, incessantly repeated their solicitations, by flying alternately from the cage to a neighbouring chimney-top, they endeavoured to show him how easily the journey was to be accomplished. He at last committed himself to the air, and alighted in safety. On his arrival, another scene of clamorous and active joy was exhibited. Next day I repeated the same experiment, by exposing another of the young ones on the top of the cage. I observed the same conduct with the remainder of the brood, which consisted of four. I need hardly add, that not one, either of the parents or children ever again revisited the execrated cage.—Smellie.

† **The Crested Wren; why a King Bird?**—We can readily understand, why the least of our British birds, the gold-crested wren (*Regulus cristatus*, Ray) should have been considered a royal bird in most countries, from its having a fine coronet of a bright gold colour on its head, as Aristotle correctly remarks. But why the common wren (*Anorthura communis*) should be called a king-bird we cannot conjecture, except it

All these, as was said, live for the most part upon insects, and are consequently of particular benefit to man. By these are his grounds cleared of the pernicious swarms of vermin that devour the budding leaves and flowers: and that even attack the root itself, before ever the vegetable can come to maturity. These seek for and destroy the eggs of insects that would otherwise propagate in numbers beyond the arts of man to extirpate; they know better than man where to seek for them; and thus at once satisfy their own appetites, and render him the most essential services.

But this is not the only merit of this tribe; in it we have the sweetest songsters of the grove; their notes are softer, and their manner more musically soothing than those of hard-billed birds. The foremost in musical fame are, the nightingale, the thrush, the blackbird, the lark, the redbreast, the blackcap, and the wren.

Birds of the sparrow kind, with thick and short bills, are the grosbeak,* the

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has been from irony or antiphrasis, in the same way as M. Hebert tells us it is called the ox (*bœuf*) in some provinces of France From being unable to account for the latter fact, Gesner. Willughby. and other naturalists, accuse Belon, Brisson, and Oliva, of confounding the two species. To us, however, this charge appears groundless, for Aristotle very clearly distinguishes the two birds; and yet he says the gold-crested one is called a king (τυραννος), and the common one (τροχιλος) also is called a magistrate and king (πρεσβυς και βασιλευς), "for which reason," he adds, "the eagle is said to fight with it." Independently of this authority, the popular titles given to the common wren, in most languages, by the peasants who know nothing of the disputes of naturalists, prove that there must be some cause for the term unconnected with any confusion of the species For example, the Italians call it the little king (*reattino*). the king of the hedge (*re di siepe*). the king of the birds (*re degli uccelli*); the Spaniards, the kinglet, (*reyezuelo*); the Portuguese, the bird-king (*ave rei*); the French, the little king (*roitelet*), or king-berry (*roi-berry*), or the king of cold (*roi de froidure*); and the Germans, the snow-king (*schnee-konig*), and thorn-king (*thurn konig*). At the same time, we are aware that the gold-crested wren has obtained similar titles, such as in Italy, the little pope (*papazzino*); in Germany, the king-let (*konigchen*); and in Sweden, king-bird (*kongs-vogel*). We pretend not to account for the universal diffusion of the same notion, but it is most evident it does not arise from the mistake that has been supposed —HABITS OF BIRDS.

* SOCIALITY OF BIRDS.—Upon glancing back over the details which we have already given of the solitary and social habits of birds, it will be obvious, that their sociality produces no apparent result, except it may be the appointment of a sentinel to give intimation of danger, if such appointment (as may well be doubted) actually takes place. Except in the instance of the sociable grosbeak (*Loxia socia*) of Africa, we do not recollect any authentic instance of birds uniting their efforts to assist in performing a common work. Even in this instance, the accurate observations of M Vaillant have proved, that so far from building streets, as Paterson and others represent these birds to do, they merely build their nests in actual contact, as rooks may sometimes be observed to do in this country. The notion of their building streets is of the same character with Pliny's account of the swallows in Egypt raising an embankment to oppose the inundation of the Nile, adopted by him from some hasty observer who had seen the bank swallows (*Hirundo riparia*), not building (as he supposed), but mining into an escarpment of the river. In the same way we find it related by authors of celebrity, that when a pair of sparrows take felonious possession of the nest of a swallow, the swallow summons its companions to its assistance, when they all unite in a body to bring a sufficient quantity of mortar to entomb the robber-sparrows alive in the nest. This story is obviously imaginary, and the fiction is shown from the impossibility of so entombing, by means of clay, a bird with so powerful a bill as the sparrow.

M Dupont de Nemours gives the following singular account of what fell under his own observation:—"I remarked," he says, "a swallow, which had unhappily—and I cannot imagine in what manner—slipped its foot into a slip-knot of packthread, the other end of which was attached to a spout of the College of the Four Nations. Its strength was exhausted—it hung at the end of the thread, uttered cries, and sometimes raised itself, as if making an effort to fly away. All the swallows of the large basin between the bridges of the Tuileries and the Pont Neuf, and perhaps from places more remote, had assembled to the number of several thousands. Their flight was like a cloud: all uttered a cry of pity and alarm. After some hesitation, and a tumultuous counsel, one of them fell upon a device for delivering their greenfinch, the bullfinch, the crossbill, the house-sparrow, the chaffinch, the brambling, the goldfinch, the linnet, the siskin, the bunting, the yellow-hammer, the ortolan, the wheat-ear, and several other foreign birds, of which we know rather the names than the history. These chiefly feed upon fruits, grain, and corn. They are often troublesome to man, as they are a numerous tribe: the harvest often suffers from their depredations; and while they are driven off from one end of the field, they fly round, and come in at the other.* But these have also their uses: they are frequently the distributors of seeds into different districts: those grains which they swallow, are sometimes not wholly digested; and these, laid upon a soil congenial to them, embellish the face of nature with that agreeable variety which art but vainly attempts to imitate. The mistletoe plant, which we often see growing on the tops of elms and other trees, has been thought to be propagated in this manner; yet, as it is often seen growing on the under side of the branch, and sometimes on a perpendicular shoot, it seems extraordinary how a seed could be deposited in that situation. However this be, there are many plants propagated from the depositions of birds; and some seeds are thought to thrive the better, for first having undergone a kind of maceration in the stomach of the little animal, before it is voided on the ground.

There are some agreeable songsters in this tribe also; and those who like a loud, piercing pipe, endued with great variety and perseverance, will be pleased most with their singing. The songsters of this class are the canary-bird, the linnet, the chaffinch, the goldfinch, the greenfinch, the bullfinch, the brambling, the siskin, and the yellow-hammer. The note of these is not so generally pleasing as that of the soft-billed bird, but it usually holds longer; and, in a cage, these birds are more easily fed, and hardy.

This class of small birds, like all the greater, has its wanderers, that leave us for a season, and then return, to propagate, to sing, or to embellish the landscape here. Some of this smaller kind, indeed, are called birds of passage, that do not properly come under the denomination; for though they disappear in one place, they never leave the kingdom, but are seen somewhere else. But there are many among them, that take longer flights, and go to a region colder or warmer, as it suits their constitutions. The fieldfare and the redwing breed, pass their summers in Norway, and other cold countries, and are tempted hither to our mild winters, and to those various berries which then abound with us, and make their principal food. The hawfinch and the crossbill are uncertain visitants and have no stated times of migration. Swallows of every species disappear at the approach of winter. The nightingale, the blackcap, the flycatcher, the willow-wren, the wheatear, the whinchat, and the stonechatter, leave us long before the approach of winter; while the siskin and the linnet only forsake us when our winters are more than usually severe. All the rest of

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companion, communicated it to the rest, and began to put it into execution. Each took his place; all those who were at hand went in turn, as in the sport of running at the ring, and, in passing, struck the thread with their bills. These efforts, directed to one point, were continued every second, and even more frequently. Half an hour was passed in this kind of labour before the thread was severed and the captive restored to liberty. But the flock, only a little diminished," adds M. Dupont de Nemours, "remained until night, chattering continually in a tone which no longer betrayed anxiety, and as if making mutual felicitations and recitals of their achievement."

Now we doubt not that these swallows crowded to their companion, as M. Dupont has recorded, for all small birds are apt to come when called by their fellows, as is well known to bird-catchers, who employ call-birds to bring the wild ones to their nets; but we much doubt whether they united their efforts with the design of cutting the string, and think the observer must have been deceived as to this particular. In a similar instance of a pair of sparrows becoming entangled, which fell under our observation, their neighbours crowded to the place; but, apparently, only for the purpose of scolding, not of assisting, the entangled birds.

Rennie—Habits of Birds.

* Appetite of the Sparrow.—The progeny of the sparrow are most voracious. It has been calculated that a pair of sparrows, during the time they have their young to feed, destroy on an average 3,360 caterpillars in a week.—Ed.

the smaller tribe never quit this country; but support the severest rigours of the climate.* Having thus given a general idea of the birds of this class, it will be proper to give some account of the most remarkable among them.

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* Soft-billed Singing Birds: Time of Song.

1.	Woodlark	*Alauda arborea*	In January, and continues to sing through all the summer and autumn.
2.	Song-thrush	*Turdus simpliciter dictus*	In February, and on to August; resume their song in Autumn.
3.	Wren	*Passer troglodytes*	All the year, hard frost excepted.
4.	Red-breast	*Rubecula*	Ditto. ditto.
5.	Hedge-sparrow	*Curuca*	Early in February, to July the 10th.
6.	Yellow-hammer	*Emberiza flava*	Early in February, and on through July to August the 21st.
7.	Skylark	*Alaudo vulgaris*	In February, and on to October.
8.	Swallow	*Hirundo domestica*	From April to September.
9.	Black-cap	*Atricapilla*	Beginning of April, to July 13th.
10.	Titlark	*Alauda pratorum*	From middle of April, to July 16th.
11.	Blackbird	*Merula vulgaris*	Sometimes in February and March, and so on to July the 23rd; re-assumes in autumn.
12.	White-throat	*Ficedulæ affinis*	In April, and to July 23.
13.	Goldfinch	*Carduelis*	April, and through to September 16.
14.	Greenfinch	*Chloris*	On to July and August 2nd.
15.	Less reed-sparrow	*Passer arundinaceus minor*	May, on to beginning of July.
16.	Common linnet	*Linaria vulgaris*	Breeds and whistles on till August; re-assumes its note when they begin to congregate, in October, and again early before the flocks separate.

Birds that cease to be in full song, and are usually silent at or before Midsummer:—

17.	Middle willow-wren,	*Regulus non cristatus*	Middle of June; begins in April.
18.	Redstart	*Ruticilla*	Ditto; begins in May.
19.	Chaffinch	*Fringilla*	Beginning of June, sings first in February.
20.	Nightingale	*Luscinia*	Middle of June; sings first in April.

Birds that sing for a short time, and very early in the spring:—

21.	Missel-bird	*Turdus viscivorus*	January the 2nd, 1770, in February. Is called in Hampshire and Sussex the storm-cock, because its song is supposed to forebode windy, wet weather. Is the largest singing bird we have.
22.	Great Titmouse, or ox-eye	*Fringillago*	In February, March, and April; re assumes for a short time in Sept.

Birds that have somewhat of a note or song, and yet are hardly to be called singing birds:

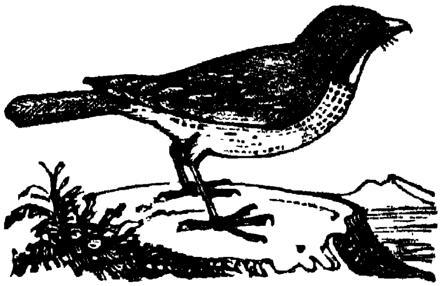
		RAII NOMINA.	
23.	Golden-crowned wren	*Regulus cristatus*	Its note as minute as its person; frequents tops of high oaks and furs: the smallest British bird.
24.	Marsh titmouse	*Parus Palustris*	Haunts great woods; two harsh, sharp notes.
25.	Small willow-wren	*Regulus non cristatus*	Sings in March, and on to September.
26.	Largest ditto	*Ditto*	*Cantat voce stridula locustæ;* from end of April to August.
27.	Grasshopper lark	*Alauda minima voce locustæ*	Chirps all night, from the middle of April to the end of July.
28.	Marten	*Hirundo agrestis*	All the breeding time; from May to September.
29.	Bullfinch	*Pyrrhula*	
30.	Bunting	*Emberiza alba*	From the end of January to July.

CHAP. II.

THE THRUSH AND ITS AFFINITIES.

WITH the THRUSH we may rank the redwing, the fieldfare, the blackbird, the ring-ouzel, and the water-ouzel.

These are the largest of the sparrow kind, and may be distinguished from all others of this class, as well by their size, which is well known, as by their bills, which are a little bending at the point; a small notch near the end of the upper chap, and the outmost toe adhering as far as the first joint of the middle toe. To this tribe may be also added the stare or starling, which, though with a flat bill, too much resembles these birds to be placed any where else.


(The Thrush.)

The missel-thrush is distinguished from all of the kind by its superior size, being much larger than any of them. It differs scarcely in any other respect from the throstle, except that the spots on the breast are larger. It builds its nest in bushes, or on the side of some tree,

All singing birds, and those that have any pretensions to song, not only in Britain, but perhaps the world through, come under the Linnæan *ordo* of *passeres*.

The above-mentioned birds, as they stand numerically, belong to the following genera:—

1, 7, 10, 27	*Alauda.*	8, 28	*Hirundo.*
2, 11, 21	*Turdus.*	13, 16, 19	*Fringilla.*
3, 4, 5, 9, 12, 15, 17, 18, 20, 23, 25, 26,	*Motacilla.*	22. 24	*Parus.*
6, 30	*Emberiza.*	14, 29	*Loxia.*

Birds that sing as they fly are but few.

	RAII NOMINA.	
Skylark	*Alauda vulgaris*	Rising, suspended, and falling.
Titlark	*Alauda pratorum*	In its descent; also sitting on trees, and walking on the ground.
Woodlark	*Alauda arborea*	Suspended; in hot summer nights all night long.
Blackbird	*Merula*	Sometimes from bush to bush.
White-throat	*Ficedulæ affinis*	Uses, when singing on the wing, odd jerks and gesticulations.
Swallow	*Hirundo domestica*	In soft, sunny weather.
Wren	*Passer troglodytes*	Sometimes from bush to bush.

Birds that breed most early in these parts:—

Raven	*Corvus*	Hatches in February and March.
Song-thrush	*Turdus*	In March.
Blackbird	*Merula*	In March.
Rook	*Cornix frugilega*	Builds in the beginning of March.
Woodlark	*Alauda arborea*	Hatches in April.
Ringdove	*Palumbus torquatus*	Lays in the beginning of April.

WHITE'S SELBORNE.

as all of this kind are found to do, and lays four or five eggs in a season.[*] Its song is very fine, which it begins in spring, sitting on the summit of a high tree. It is the largest bird of all the feathered tribe that has music in its voice; the note of all greater birds being either screaming, chattering, or croaking. It feeds on insects, holly, and mistletoe-berries; and sometimes sends forth a very disagreeable scream when frighted or disturbed.[†]

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[*] **The Song Thrush.**—Grahame, in his Birds of Scotland, gives a very exact account of the localities of the song-thrush, though he is wrong in thinking the nest lined with loam:

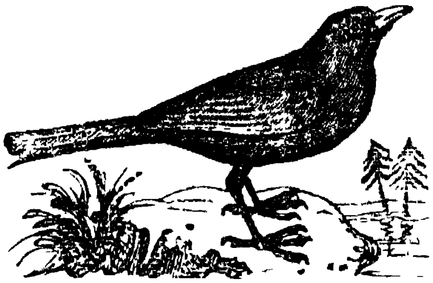
"In the hazel bush or sloe is formed
The habitation of the wedded pair,
Sometimes below the never-fading leaves
Of ivy close, that overtwisting binds,
And richly crowns, with clustered fruit of spring,
Some river rock, or nodding castle wall;
Sometimes beneath the jutty root of elm,
Or oak, among the sprigs, that overhang
A pebble chiding stream, the loam-lined house
Is fixed, well hid from ken of hovering hawk,
Or lurking beast, or school-boy's prowling eye."

Ed.

[†] **Habits of the Thrush.**—*Túrdus músicus.*)—In the course of last August, travelling on the coach to Edinburgh, I met, as a fellow-passenger, a very sensible man, whom I discovered to be a master millwright, from Fife. After much desultory conversation, we came to remark the great increase of thrushes and blackbirds all over the country, and their cruel depredations on gardens. Having noticed the singular tameness of the thrush, particularly in the odd places it sometimes chooses for constructing its nest, my companion asked if I had ever observed any of them make their nest within a house; and added that he once saw such an instance, and came to be greatly interested by it. He had been making a threshing-machine for a farmer in the neighbourhood of Pitlessie, in Fife, and had three of his men along with him. They wrought in a cart shed, which they had used for some time as their workshop; and one morning they observed a *mavis* enter the wide door of the shed, over their heads, and fly out again after a short while; and this she did two or three times, until their curiosity was excited to watch the motions of the birds more narrowly; for they began to suspect that the male and female were both implicated in this *ish and entry.* Upon the joists of the shed were placed, along with some timber for agricultural purposes and old implements, two small harrows used for grass seeds, laid one above the other; and they were soon aware that their new companions were employed, with all the diligence of their kind, in making their nest in this singular situation. They had built it, he said, between one of the bulls of the harrow and the adjoining tooth; and by that time, about seven o'clock, and an hour after he and his lads had commenced their work, the birds had made such progress, that they must have begun by the *screich of day.* Of course, he did not fail to remark the future proceedings of his new friends. Their activity was incessant; and he noticed that they began to carry mortar (he said), which he and his companions well knew was for plastering the inside. Late in the same afternoon, and at six o'clock next morning, when the lads and he entered the shed, the first thing they did was to look at the mavis's nest, which they were surprised to find occupied by one of the birds, while the other plied its unwearied toil. At last the sitting bird, or hen as they now called her, left the nest likewise; and he ordered one of the apprentices to *climb the baulks*, who called out that she had laid an egg; and this she had been compelled to do some time before the nest was finished; only plastering the bottom, which could not have been done so well afterwards. When all was finished, the cock took his share in the hatching; but he did not sit so long as the hen, and he often fed her while she was upon the nest In thirteen days the young birds were out of the shells, which the old ones always carried off. At first they could not be quite certain what food was brought for the young; but this, in time, became an object of peculiar interest, and he and his companions noticed that the birds brought "a grit hantle o' stripit buckies" *Hèlix nemorális, horténsis*, and *arbustòrum*); that she did not try to pick the snails from the buckies, but lifted each above her head, gave it a sharp lick on a tooth of the harrow, and broke it all to pieces, and then caught the snail: she never let one fall. She never brought any common snails (without shells), and not many worms. Sometimes she brought butterflies; and she brought a *hantle o' muffies* (large moths). She generally carried away the dung of the young birds. As the young grew, and demanded greater supplies, the entrance and retreat of the parents through the door of the shed was often so rapid that it could not be seen, but was only known from the *swoof*, or sound, as they darted over the heads of the men.

One Monday morning, when the millwrights came to work at the usual hour, and expected the daily pleasure of seeing the mavises alert and busy, the nest was gone. A boy, prowling about on the Sunday, had found the little "family of love." "The parents," my friend said, "mourned about for twa days: maistly the hen." He him-

The **BLACKBIRD**, which in cold countries, and particularly upon the Alps, is sometimes seen all over white, is a beautiful and canorous bird, whistling all the spring and summer-time with a note at a distance the most pleasing of all the grove. It is the deepest toned warbler of the woods; but it is rather unpleasant in a cage, being loud and deafening. It lays four or five bluish eggs, in a nest usually built at the stump of some old hawthorn, well plastered on the inside with clay, straw, and hair.*



(The Blackbird.)

Pleasing, however, as this bird may be, the blue bird, described by Bellonius, is in every respect far superior. This beautiful animal entirely resembles a blackbird in all but its blue colour. It lives in the highest parts of the Alps, and even there chooses the most craggy rocks and the most frightful precipices for its residence. As it is rarely caught, it is in high estimation even in the countries where it breeds, but still more valuable when carried from home. It not only whistles in the most delightful manner, but speaks with an articulate, distinct voice. It is so docile, and observes all things with such diligence, that, though waked at midnight by any of the family, it will speak and whistle at the word of command.† Its colour, about the beginning of winter, from blue becomes black,

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self, he said, could not well settle to his work for an hour or twa, and was "neither to ha'd nor to bind, he was sae mad at the illdeedy laddie."—Corres. Mag. Nat. Hist.

* The Blackbird.—This bird is well known as a native of the British Islands. It is of a shy and restless disposition, always anxious to escape from observation, and generally successful in that effort, as it hops with singular celerity through the closest hedges or thickets; and its presence is often only known by the note it utters on alarm. It never associates ostensibly, preferring a solitary life, which it passes in woods, or in well-inclosed situations, where the hedges afford it an abundant supply of provision for the winter. It also feeds upon worms and insects, and, like the thrush is particularly fond of the *helix nemoralis*, to obtain the snail of which, it pursues the same process as that bird. The notes of the blackbird are rich and full, but destitute of that varied power of melody which distinguishes the song of the common thrush. It commences building its nest in March, or the beginning of April, and a thick bush, or an ivy-clad tree, is usually the chosen situation. The nest is composed of moss, small sticks, and fibres of roots, plastered with mud internally, and afterwards lined with fine dry grass. Like the thrush, it is frequently kept in confinement, and may be taught to whistle a variety of tunes, as well as to imitate the human voice.—Ed.

† Imitative Powers of the Blackbird.—The following circumstance, as to the imitative powers of the blackbird, is a new fact in natural history, and was recorded by the Rev. Barton Bouchier, of Wold Rectory, near Northampton, in April, 1831. "Within half a mile of my residence," says he, "there is a blackbird which crows constantly, and as accurately as the common cock, and nearly as loud—as it may, on a still day, be heard at the distance of several hundred yards. When first told of the circumstance, I conjectured that it must have been the work of a cock pheasant, concealed in a neighbouring brake; but on the assurance that it was nothing more or less than a common blackbird, I determined to ascertain the fact with my own eyes and ears; and this day I had the gratification of getting close to it, seated on the top bough of an ash tree, and pursuing with unceasing zeal its unusual note. The resemblance to the crow of the domestic cock is so perfect, that more than one in the distance were answering to it; and the little fellow seemed to take delight in competing with its rivals of the dunghill. It occasionally indulged in its usual song, but only for a second or two, resuming its more favourite note; and once or twice it commenced with crowing, and broke off in the middle to its more natural whistle. I am not aware that the blackbird has ever been included among those birds which could be taught to imitate sounds: such as the starling, jay, or magpie; and in what way this bird has acquired its present propensity I am unable to say, except that, as its usual haunt is near a mill where poultry are kept, it may have learnt the note from the common fowl."

Blackbirds can be taught various airs while in a state of captivity; but we consider the circumstance of this bird, in a wild state, imitating the crowing of a cock, as very remarkable.—Ed.—White's Selborne.

which changes to its original hue on the first approaches of spring. It makes its nest in deep holes, in very high and inaccessible solitudes, and removes it not only from the accesses of man, but also hides it with surprising cunning from the chamois and other wild beast that might annoy its young.

The **Field-fare** and the **Red-wing** make but a short stay in this country.* With us they are insipid, tuneless birds, flying in flocks, and excessively watchful to preserve the general safety. All their season of music and pleasure is employed in the more northern climates, where they sing most delightfully, perched among the forests of maples with which those countries abound. They build their nests in hedges; and lay six bluish-green eggs spotted with black.

The **Stare**, distinguishable from the rest of this tribe by the glossy green of its feathers, in some lights, and the purple in others, breeds in hollow trees, eaves of houses, towers, ruins, cliffs, and often in high rocks over the sea. It lays four or five eggs of a pale-greenish ash colour, and makes its nest of straw, small fibres of roots, and such like. Its voice is rougher than the rest of this kind; but what it wants in the melody of its note, it compensates by the facility with which it is taught to speak. In winter, these birds assemble in vast flocks and feed upon worms and insects. At the approach of spring, they assemble in fields, as if in consultation together, and for three or four days seem to take no nourishment: the greater part leave the country, the rest breed here and bring up their young.*

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* **The Field-fare**.—The extensive low lands of the river Severn, in open weather, are visited by prodigious flocks of these birds; but as soon as snow falls, or hard weather comes on, they leave these marshy beds, because their insect food is covered, or become scarce, visit the uplands, to feed on the produce of the hedges; and we see them all day long passing over our heads, in large flights, on some distant progress, in the same manner as our larks, at the commencement of a snowy season, repair to the turnip-fields of Somerset and Wiltshire. They remain absent during the continuance of those causes which incited their migration; but as the frost breaks up, and even before the thaw has actually commenced, we see a large portion of these passengers retiring to their worm and insect food in the meadows, attended probably by many that did not take flight with them; though a great number remain in the upland pastures, feeding promiscuously as they can. In my younger days, a keen, unwearied sportsman, it was always observable, that in hard weather these birds increased prodigiously in number in the counties far distant from the meadow lands, though we knew not the reason; and we usually, against the time, provided tempting bushes of haws, preserved in a barn, to place in frequented hedges, near our secret standings. When the Field-fare first arrives, its flesh is dark, thin, and scurfy; but having fed a little time in the hedges, its rump and side veins are covered with fat. This is, in part, attributable to suppression of perspiration by the cold, and partly to a nutritive, farinaceous food; its flesh at the time becoming bluish and clean. The upland birds are in this state from, perhaps, the end of November till the end of January, according as the hedge-fruit has held out; and at this period they are comparatively tame: afterwards, though the flights may be large, they become wild; and the flesh, assuming its darkness, manifests that their food has not been farinaceous.

Perfectly gregarious as the Field-fare is, yet we observe every year in some tall hedge-row, or little quiet pasture, two or three of them that have withdrawn from the main flocks, and there associate with the blackbird and the thrush. These retiring birds linger with us late in the season, after all the main flights have departed, as if reluctant to leave us; but towards the middle or end of April these stragglers unite, form a small company, and take their flight.

Journal of a Naturalist.

The Red-wing.—This species, like the field-fare, is a periodical visitant, and generally makes its appearance a few weeks prior to that bird, arriving upon our north eastern coasts about the middle or latter part of October. The habits of this bird are very similar to those of the other species. It has a clear and melodious note, and its song, when in its native or summer residence, is said to be scarcely inferior to that of our common thrush. Upon the approach of spring, it returns to the northern provinces of Europe, where it breeds and passes the summer. It is very abundant in Sweden, Norway, Lapland, and Russia.

In the year 1822, during the severe frost, which lasted three weeks, large flocks of field-fares and red-wings were collected about the hedges and on the outskirts of the woods, where they lived upon the berries of hawthorn, which fortunately for them were in great abundance. This supply, however, rapidly decreased; but a few days of thaw occurring, they were enabled to pursue their migration southward.—Selby

In the hard winter of 1799, vast numbers of them resorted to the west of England, where a sudden fall of snow, unusually deep in that part, cut them off from all supply of food; and being too weak to attempt a passage over sea, to a warmer climate, thousands of these, and their companions the field-fares, were starved to death."—Montagu.

To this tribe might be added above a hundred other birds of nearly the thrush size, and living like them upon fruit and berries. Words could not afford variety enough to describe all the beautiful tints that adorn the foreign birds of the thrush kind. The brilliant green of the emerald, the flaming red of the ruby, the purple of the amethyst, or the bright blue of the sapphire, could not by the most artful combination show anything so truly lively or delightful to the sight as the feathers of the chlcoqui or the tautotol. Passing, therefore, over these beautiful but little known birds, I will only mention the American **Mock-Bird**, the favourite songster of a region where the birds excel rather in the beauty of their plumage than the sweetness of their notes.†

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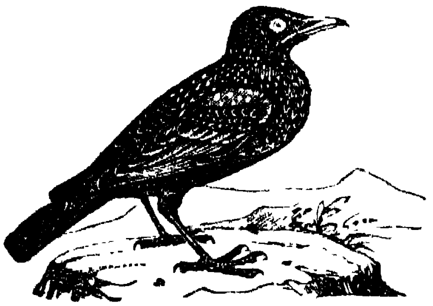
* The Starling.—This is a plentiful species; it is found in almost every part of the old continent. Many stay with us the whole year, but the vast flocks that are seen in severe winters probably migrate to this country in search of food, and return northward in the spring. We have observed continued flights of these birds going westward into Devonshire and Cornwall, in hard weather, and returning eastward as soon as the frost breaks up. Their food is chiefly insects, but in defect of these they will eat grain. Great numbers are frequently taken in England in our pigeon-houses, where they roost for the sake of warmth; but we believe they rarely, if ever, suck the eggs of that bird, as is attributed to them. It will, indeed, sometimes build in such places, but more frequently in the hole of a tree, and sometimes in an old building. The nest is made of dry grass, on which it lays four or five light-blue eggs, about one drachm and three-quarters in weight. The natural notes of this bird are a shrill whistle and a chattering noise; but in confinement, where it becomes very docile, it is taught to imitate the human voice and to whistle tunes.



(The Starling.)

In the autumnal and hyemal months, these birds gather in immense flocks, and are particularly abundant, in the fenny parts of Nottinghamshire and Lincolnshire, where they roost among the reeds. Before they retire to rest, they perform various manœuvres in the air, the whole frequently describing rapid evolutions round a common centre. This peculiar flight will sometimes continue for nearly half an hour before they become finally settled for the night. Upon the approach of spring they pair, and spread themselves over the whole country.—Selby.

† The Mocking-Bird.—The mocking-bird seems to be the prince of all song birds, being altogether unrivalled in the extent and variety of his vocal powers; and, besides the fulness and melody of his original notes, he has the faculty of imitating the notes of all other birds, from the humming-bird to the eagle. Pennant tells us that he heard a caged one, in England, imitate the mewing of a cat and the creaking of a sign in high winds. The Honourable Daines Barrington says his pipe comes the nearest to our nightingale of any bird he ever heard. The description, however, given by Wilson, in his own inimitable manner, as far excels Pennant and Barrington as the bird excels his fellow-songsters. Wilson tells that the ease, elegance, and rapidity of his movements, the animation of his eye, and the intelligence he displays in listening and laying up his lessons, mark the peculiarity of his genius. His voice is full, strong, and musical, and capable of almost every modulation, from the clear, mellow tones of the wood-thrush to the savage scream of the bald eagle. In measure and accent he faithfully follows his originals, while in force and sweetness of expression he greatly improves upon them. In his native woods, on a dewy morning, his song rises above every competitor, for the others seem merely as inferior accompaniments. His own notes are bold and full, and varied seemingly beyond all limits. They consist of short expressions of two, three, or at most five or six, syllables, generally expressed with great emphasis and rapidity, and continued

This valuable bird does not seem to vie with the feathered inhabitants of that country in the beauty of its plumage, content with qualifications that endear it to mankind much more. It is but a plain bird to the eye, about the size of a thrush, of a white and grey colour, and a reddish bill. It is possessed not only

with undiminished ardour, for half an hour or an hour at a time. While singing, he expands his wings and his tail, glistening with white, keeping time to his own music, and the buoyant gaiety of his action is no less fascinating than his song. He sweeps round with enthusiastic ecstacy, he mounts and descends as his song swells or dies away; he bounds aloft, as Bartram says, with the celerity of an arrow, as if to recover and recall his very soul, expired in the last elevated strain. A bystander might suppose that the whole feathered tribes had assembled together on a trial of skill; each striving to produce his utmost effect, so perfect are his imitations. He often deceives the sportsman, and even birds themselves are sometimes imposed upon by this admirable mimic. In confinement he loses little of the power or energy of his song. He whistles for the dog; Cæsar starts up, wags his tail, and runs to meet his master. He cries like a hurt chicken, and the hen hurries about, with feathers on end, to protect her injured brood. He repeats the tune taught him, though it be of considerable length, with great accuracy. He runs over the notes of the canary, and of the red bird, with such superior execution and effect that the mortified songsters confess his triumph by their silence. His fondness for variety some suppose to injure his song. His imitations of the brown thrush are often interrupted by the crowing of cocks; and his exquisite warblings after the blue bird are mingled with the screaming of swallows, or the cackling of hens. During the moonlight, both in the wild and tame state, he sings the whole night long. The hunters, in their night excursions, know that the moon is rising the instant they begin to hear his delightful solo. After Shakspeare, Barrington attributes in part the exquisiteness of the nightingale's song to the silence of the night; but if so, what are we to think of the bird which, in the open glare of day, overpowers and often silences all competition? His natural notes partake of a character similar to those of the brown thrush, but they are more sweet, more expressive, more varied, and uttered with greater rapidity.

The Yellow-breasted Chat naturally follows his superior in the art of mimicry. When his haunt is approached, he scolds the passenger in a great variety of odd and uncouth monosyllables, difficult to describe, but easily imitated so as to deceive the bird himself, and draw him after you to a good distance. At first are heard short notes like the whistling of a duck's wings, beginning loud and rapid, and becoming lower and slower till they end in detached notes. There succeeds something like the barking of young puppies, followed by a variety of gutteral sounds, and ending like the mewing of a cat, but much hoarser.

The song of the Baltimore Oriol is little less remarkable than his fine appearance and the ingenuity with which he builds his nest. His notes consist of a clear, mellow whistle, repeated at short intervals as he gleams among the branches. There is in it a certain wild plaintiveness and *naïveté* extremely interesting. It is not uttered with rapidity, but with the pleasing tranquillity of a careless ploughboy, whistling for amusement. Since the streets of some of the American towns have been planted with Lombardy poplars, the orioles are constant visiters, chanting their native "wood-notes wild," amid the din of coaches, wheel-barrows, and sometimes within a few yards of a bawling oyster-woman.

The Virginian Nightingale, Red Bird, or Cardinal Grosbeak, has great clearness, variety, and melody in his notes, many of which resemble the higher notes of a fife, and are nearly as loud. He sings from March till September, and begins early in the dawn, repeating a favourite stanza twenty or thirty times successively, and often for a whole morning together, till, like a good story too frequently repeated, it becomes quite tiresome. He is very sprightly and full of vivacity; yet his notes are much inferior to those of the wood; or even of the brown, thrush.

The whole song of the Black-throated Bunting consists of five, or rather two, notes—the first repeated twice and very slowly, the third thrice and rapidly, resembling *chip-chip, che-che-che*; of which ditty he is by no means parsimonious, but will continue it for hours successively. His manners are much like those of the European yellow-hammer, sitting, while he sings, on palings and low bushes.

The song of the Rice Bird is highly musical. Mounting and hovering on the wing, at a small height above the ground, he chants out a jingling melody of varied notes, as if half a dozen birds were singing together. Some idea may be formed of it by striking the high keys of a pianoforte singly and quickly, making as many contrasts as possible of high and low notes. Many of the tones are delightful, but the ear can with difficulty separate them. The general effect of the whole is good; and when ten or of its own natural notes, which are musical and solemn, but it can assume the tone of every other animal in the wood, from the wolf to the raven. It seems even to sport itself in leading them astray. It will at one time allure the lesser birds with the call of their males, and then terrify them when they have come near with the screams of the eagle. There is no bird in the forest but it can mimic; and there is none that it has not at times deceived by its call. But not like such as we usually see famed for mimicking with us, and who have no particular merit of their own, the mock-bird is ever surest to please when it is most itself. At those times it usually frequents the houses of the American planters; and, sitting all night on the chimney-top, pours forth the sweetest and the most various notes of any bird whatever. It would seem, if accounts be true, that the deficiency of most other song-birds in that country is made up by this bird alone. They often build their nests in the fruit trees about houses, feed upon berries and other fruits, and are easily rendered domestic.*

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twelve are singing on the same tree, the concert is singularly pleasing

The Red-eyed Fly-catcher has a loud, lively, and energetic song, which is continued sometimes for an hour without intermission The notes are, in short, emphatic bars of two, three, or four syllables On listening to this bird, in his full ardour of song, it requires but little imagination to fancy you hear the words "Tom Kelly! whip! Tom Kelly!" very distinctly; and hence Tom Kelly is the name given to the bird in the West Indies

The Crested Titmouse possesses a remarkable variety in the tones of its voice, at one time not louder than the squeaking of a mouse, and in a moment after whistling aloud and clearly, as if calling a dog, and continuing this dog-call through the woods for half an hour at a time.

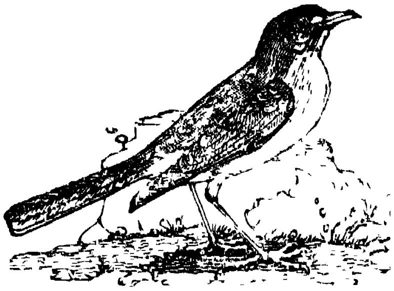
The Red-breasted Blue Bird has a soft, agreeable, and often-repeated warble, uttered with opening and quivering wings. In his courtship he uses the tenderest expressions, and caresses his mate by sitting close by her, and singing his most endearing warblings. If a rival appear, he attacks him with fury, and having driven him away, returns to pour out a song of triumph. In autumn his song changes to a simple plaintive note, which is heard in open weather all winter, though in severe weather the bird is never to be seen.—ARCANA OF SCIENCE, 1830.

* BIRDS SOLITARY AND GREGARIOUS — The golden plover (*Charadrius pluvialis*, Temminck) is another bird celebrated for setting a watch. Longolius says these birds are so attached to society, that a single bird is never seen. Belon gives a minute account of their proceedings, which we shall translate. "The plovers," says he, "call to one another at day-break, whistling in a manner similar to that of a man, and answering to the word *hinc*. The peasants, hearing this, try the next day to discover a covey; for the plover by day remains in society, but at the approach of night strays from his flock, and on the following morning his companions are scattered about at a quarter or half a league's distance from each other. There is one in the flock who is looked upon and acknowledged as master or king His voice is louder than the others, and well known, and is their signal for congregating. The peasants name him the *caller*, and pretend to distinguish him by his notes being longer than those of the rest. At his rising he utters a cry resembling *The bien huit*. The peasants on the frontiers, who go in bands, assemble in the evening, where they have heard the king plover, and where they may find him at dawn —and having set out before day, some here and some there, scattering themselves about over the corn lands, they wait till day-break, and when they hear the whistle of the king, which may be heard at a league's distance, calling his company together, they make straight towards him, being certain that the whole covey will repair to the same place. The plover is not so early a bird as the partridge, the lark, or the lapwing; but rises soon after dawn. And when the plovers of the flock have heard the notes of their caller they immediately hasten to him. If by chance, also, two flocks are upon the plain, and mixed together, the plovers will distinguish the cries of their king, and make towards him. When day appears, the peasants assemble, and report to each other what they have heard, and resolve what they shall do. Then the company depart, marching in battle array and keeping the same road. But when they approach the spot where the plovers are encamped, they spread into an arch or crescent, and as they advance attentively look before them to ascertain all they can of the covey which is around its caller. Each peasant carries a long pole, and one or two among them bear the "harnois," or net, to take the plovers, which they have observed in the level plain. And the peasants, knowing that plovers are exceedingly timid, stretch the net as near them as they can. Whilst one of them is busy about this, the rest are spread behind on all sides, and creep upon

CHAP. III.

THE NIGHTINGALE AND OTHER SOFT-BILLED SONG-BIRDS.

The Nightingale is not only famous among the moderns for its singing, but almost every one of the ancients who undertook to describe beautiful nature has contributed to raise its reputation.


(The Nightingale.)

This most famous of the feathered tribe visits England in the beginning of April, and leaves us in August. It is found but in some of the southern parts of the country, being totally unknown in Scotland, Ireland, or North Wales.* They frequent thick hedges and low coppices, and generally keep in the middle of the bush, so that they are rarely seen. They begin their song in the evening, and generally continue it for the whole night. For weeks together, if undisturbed, they sit upon the same tree; and Shakspeare rightly describes the nightingale sitting nightly in the same place, which I have frequently observed she seldom departs from.

From Pliny's description, we should be led to believe this bird possessed of a persevering strain; but, though it is in fact so with the nightingale in Italy, yet in our hedges in England, the little songstress is by no means so liberal of her music. Her note is soft, various, and interrupted; she seldom holds it without a pause above the time that one can count twenty. The nightingale's pausing song would be the proper epithet for this bird's music with us, which is more pleasing than the warbling of any other bird, because it is heard at a time when all the rest are silent.†

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their bellies as near to them as possible; and when they perceive that the net is laid, and that the peasant is ready to draw it, they quickly stand upright, raise a shout, and throw their sticks into the air to scare the plovers. And when he who holds the net open sees them approach, he lets go his cord, and incloses them beneath. The peasants cast their sticks into the air, to frighten the plovers and make them fly close to the ground, in order that they may take them in their nets; for the plovers are exceedingly quick. But if the covey rise high in flight they will not take one of them."—Habits of Birds.

* Locality of the Nightingale.—The local situation of this bird, as well as many others, is probably occasioned by a peculiarity of food, which may be found in some places and not in others. It is said to be found only as far north as Yorkshire; and certainly not farther west than the eastern borders of Devonshire; although they are plentiful both in Somersetshire and Dorsetshire. Why they should not be found in all the wooded parts of Devonshire and Cornwall, which appear equally calculated for their residence, both from the mildness of the air and variety of the ground, is beyond the naturalist's penetration. The bounds prescribed to all animals, and even plants, is a curious and important fact in the great works of nature. It has been observed that the nightingale may possibly not be found in any part but where cowslips grow plentifully; certainly with respect to Devonshire and Cornwall this coincidence is just.—Montagu.

† Songs of Birds.—Syme's remarks upon the songs of birds are worth quoting. "The notes," he says, "of soft-billed birds are finely toned, mellow, and plaintive; those of the hard-billed species are sprightly, cheerful, and rapid. This difference proceeds from the construction of the larynx; as a large pipe of an organ produces a deeper and more mellow-toned note than a small pipe, so the trachea of the nightingale, which is wider

In the beginning of May, the nightingale prepares to make its nest, which is formed of the leaves of trees, straw, and moss. The nest being very eagerly sought after is as cunningly secreted; so that but very few of them are found by the boys when they go upon these pursuits. It is built at the bottom of hedges, where the bushes are thickest and best covered. While the female continues sitting, the male, at a good distance, but always within hearing, cheers the patient hour with his voice, and, by the short interruption of his song, often gives her warning of approaching danger.* She lays four or five eggs; of which but a part, in our cold climate, comes to maturity.

The delicacy, or rather the fame, of this bird's music, has induced many to abridge its liberty to be secured of its song. Indeed, the greatest part of what has been written concerning it in our country, consists in directions how to manage it for domestic singing; while the history of the bird is confined to dry receipts for fitting it for the cage.† Its song, however, when in captivity is not so very alluring; and the tyranny of taking it from those hedges where only it is most pleasing, still more depreciates its imprisoned efforts.

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than that of the canary, sends forth a deeper and more mellow-toned note. Soft-billed birds, also, sing more from the lower part of the throat than the hard-billed species. This, together with the greater width of the larynx of the nightingale and other soft-billed warblers, fully accounts for their soft, round, mellow notes, compared with the shrill, sharp, and clear notes of the canary, and other hard-billed songsters. In a comprehensive sense, the complete song of birds includes all the notes they are capable of uttering; and, taken in this sense, it is analogous to the speech of man. It is the vehicle through which these little creatures communicate and convey to each other their mutual wishes and wants. It may be divided into six distinct separate sounds or parts, each of which is very expressive, even to us, of the feelings which agitate the bird at the moment. To describe their song more fully, we shall divide it in the following manner:—First, the call-note of the male in spring; second, the loud, clear, ardent, fierce, notes of defiance; third, the soft, tender, full, melodious, love warble; fourth, the note of fear, or alarm, or war-cry, when a bird of prey appears; fifth, the note the parent-birds utter to their brood, and the chirp or note of the young. The note of the young may be again divided into two—that which they utter when in the nest, and the chirp after they have left it, for they are very distinct sounds or notes; to which may be added, a soft, murmuring kind of note, emitted by the male while he is feeding the female in the nest, and also by her while she is receiving the food. We are pretty sure the notes of parent-birds, and the chirp of their young, are only understood by birds of the same species, or rather, we should say, family—for it appears to be a family language, understood reciprocally by parent-birds and their young; for the young know the notes of their parents, and the parents those of their own brood. All the notes comprised in the songs of birds convey delight to the mind of a lover of nature; but the bird-fanciers only prize their love-warble and notes of defiance; these notes, and these only, he considers to be their song. The musical notes of birds, whether of love or war, are sweet, and really charming in themselves, but they perhaps pour on the mind a greater degree of pleasure than mere sound is capable of conveying—we mean the recollection of youthful days, or of scenes connected with rural pleasure.

* SONG OF THE NIGHTINGALE.—As Goldsmith remarks, the song of this bird is the effusion of love; and though there are some who frequently sing in autumn, and even in winter, if the weather is mild, it does not follow that they have a nest; but their testes will always be found enlarged: these are only such as are early breeders, as the redbreast, wren, and woodlark.

"The croaking of the nightingale in June and the end of May," says Knapp, "is not occasioned by the loss of voice, but by a change of note—a change of object. His song ceases when his mate has hatched her brood; vigilance, anxiety, caution, now succeed to harmony, and his croak is the hush, the warning of danger or suspicion to the infant charge and the mother-bird."—JOURNAL OF A NATURALIST.

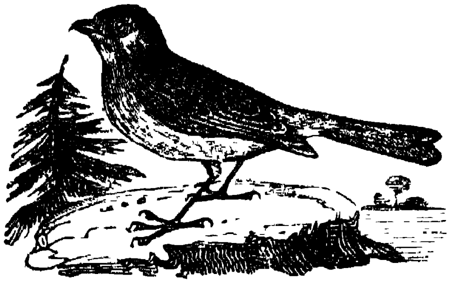
† CAPTIVITY OF THE NIGHTINGALE.—Mr. Cox lately exhibited to the Zoological Society a nightingale in fine plumage and full song, which had been four years in confinement. He stated that the error generally committed by persons attempting to keep these birds and the other species of *Sylviadæ*, was the over care bestowed upon them. A treatment not more tender than that afforded to granivorous species agreed well with the nightingale, for which it was by no means necessary to provide insects as food; meat scraped fine and mixed with egg forming a sufficient substitute, and furnishing a nourishment at once grateful to the bird and fully adequate to supply its wants.—ARCANA OF SCIENCE, 1832.

Such is the sagacity ascribed to the nightingale: it is but to have a high reputation for any one quality, and the world is ready enough to give us fame for others to which we have very small pretensions. But there is a little bird, rather celebrated for its affection to mankind than its singing, which, however, in our climate, has the sweetest note of all others. The reader already perceives that I mean the REDBREAST, the well-known friend of man, that is found in every hedge and makes it vocal. The note of other birds is louder, and their inflections more capricious; but this bird's voice is soft, tender, and well supported; and the more to be valued as we enjoy it the greatest part of the winter. If the nightingale's song has been compared to the fiddle, the redbreast's voice has all the delicacy of the flute.

The redbreast, during the spring, haunts the wood, the grove, and the garden; it retires to the thickest and shadiest hedgerows to breed in. But in winter it seems to become more domestic, and often to claim protection from man.* Most of the soft-billed birds, the nightingale, the swallow, and the titmouse, leave us in the winter, when their insect food is no longer offered in plenty; but the redbreast continues with us the year round, and endeavours to support the famine of winter by chirping round the warm habitations of mankind, by coming into those shelters where the rigour of the season is artificially expelled, and where insects themselves are found in greater numbers, attracted by the same cause.

This bird breeds differently in different places: in some countries, its nest is usually found in the crevice of some mossy bank, or at the foot of a hawthorn in hedgerows; in others, it chooses the thickest coverts, and hides its nest with oak leaves. The eggs are from four to five, of a dull white, with reddish streaks.

The lark, whether the sky-lark, the wood, or the tit-lark, being all distinguishable from other little birds by the length of their heel, are louder in their song than either of the former, but not so pleasing.†



(The Redbreast.)

* THE REDBREAST.—The statement given in most books of natural history, that the redbreast, during summer, flies from the habitation of man, which he has haunted during the winter, to nestle in wild and solitary places, is far from being strictly correct. I readily admit that many of these birds may be found in woods and forests; but I am equally certain that a greater number do not go farther from their winter haunts than the nearest hedgerows. Even in the near vicinity of London, in Copenhagen Fields, Chelsea, Battersea Fields, Peckham, wherever, indeed, there is a field and a few trees, I have heard redbreasts singing the whole summer. One has been in song all the summer, not a gunshot from my house at Lee, where this paragraph was written; and I have remarked another singing for several months among some elms at Lewisham Bridge, though there are houses all around, and the bustle of the public road just below. The redbreast does not come, indeed, usually to the cottage for crumbs during summer, because then insects are plentiful; and this may have given rise to the common opinion. I once saw an instance, however, at Compton Basset, in Wiltshire, in which a redbreast made a daily visit, in summer, within a cottage door to pick up what he could find. It is worthy of remark, that Grahame's poetical sketch of the redbreast is much more true to nature than the statements of our professed naturalists:—

"High is his perch, but humble is his home,
And well conceal'd, sometimes within the sound
Of heartsome mill-clack, where the spacious door,
White-dusted, tell him plenty reigns around;
Close at the root of brier-bush that o'erhangs
The narrow stream, with shealings bedded white,
He fixes his abode and lives at will.
Oft near some single cottage he prefers
To rear his little home; there, pert and spruce,
He shares the refuse of the good wife's churn;
Nor seldom does he neighbour the low roof
Where tiny elves are taught."

BIRDS OF SCOTLAND.

It is a constant inhabitant of the greater part of the European continent. About Barnholm, it is called Tomne-Leden; in Norway, Peter Ronsmad; in Germany, Thomas Gierdet; with us, Redbreast and Ruddock.—RENNIE.

† SONG OF THE LARK.—This is a justly celebrated bird of song. Though monoto-

The lark builds its nest upon the ground, beneath some turf that serves to hide and shelter it. The female lays four or five eggs, of a dusky hue in colour, somewhat like those of a plover. It is while she is sitting that the male thus usually entertains her with his singing; and while he is risen to an imperceptible height, yet he still has his loved partner in his eye, nor once loses sight of the nest either while he ascends or is descending. This harmony continues several months, beginning early in the spring on pairing. In winter they assemble in flocks, when their song forsakes them, and the bird-catchers destroy them in great numbers for the tables of the luxurious.[*]

The Black-cap and the Wren, though so very diminutive, are yet prized by some for their singing.[†] The former is called by some the mock nightingale;

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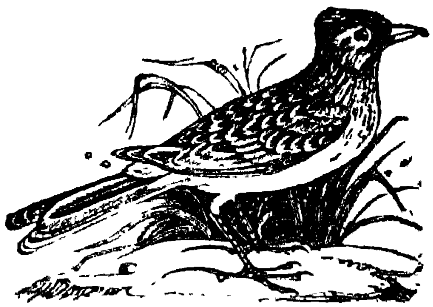
nous, it is cheerful, and imparts a gaiety to the mind of even the most serious. His joyous matins and heavenward flight have been aptly compared to hymns and acts of adoration and praise. No bird sings with more method: there is an overture performed *vivace crescendo*, while the singer ascends; when at the full height, the song becomes *moderato*, and distinctly divided into short passages, each repeated three or four times over, like a *fantasia*, in the same key and time. If there be any wind, he rises perpendicularly by bounds, and afterwards poises himself with breast opposed to it. If calm, he ascends in spiral circles; in horizontal circles during the principal part of his song, and zigzagly downwards during the performance of the *finale*. Sometimes, after descending about half way, he ceases to sing, and drops with the velocity of an arrow to the ground. Those acquainted with the song of the sky-lark can tell without looking at them whether the birds be ascending or stationary in the air, or on their descent; so different is the style of the song in each case. In the first, there is an expression of ardent impatience; in the second, an *andante* composure, in which rests of a bar at a time frequently occur; and, in the last, a graduated sinking of the strains, often touching the subdominant before the final close. The time and number of the notes often correspond with the vibrations of the wings; and though they sometimes sing while on the ground, as they are seen to do in cages, their whole frame seems to be agitated by their musical efforts.—Magazine of Natural History.

[*] The Lark.—I have for some time past been endeavouring to assign a use for the remarkable, and, indeed, what appears disproportionate, length of the claws of the sky-lark, and it lately afforded me no small gratification to think that I had discovered the purposes for which it is furnished with them. That they were not intended to enable the bird to search the earth for food, or to fix itself more securely on the branches of trees, is evident, as they neither scratch the ground nor roost on trees. The lark makes its nest generally in grass fields, where it is liable to be injured either by cattle grazing over it or by the mower. In case of alarm from either these or other causes, the parent-birds remove their eggs, by means of their long claws, to a place of greater security; and this transportation I have observed to be effected in a very short space of time. By placing a lark's egg, which is rather large in proportion to the size of the bird, in the foot, and then drawing the claws over it, you will perceive that they are of sufficient length to secure the egg firmly, and by this means the bird is enabled to convey its eggs to another place, where she can set upon and hatch them.—Jesse's Gleanings.



(The Lark.)

Its Song.—Notwithstanding all that poets have said of the nightingale, it is, perhaps, listened to during its aërial flights with more pleasure than any other songster we love.

> "To hear the lark begin its flight,
> And, singing, startle the dull night
> From his watch-tower in the skies,
> Till the dapple dawn doth rise;
> Then to come, in spite of sorrow
> And at my window bid good morrow."
>
> Milton's L'Allegro.

[†] The Black-cap.—The black-cap is truly a most delightful warbler, and may be ranked as second in the class of British song-birds. Indeed, in our own opinion, its mellow notes are equal, if not superior, in richness of tone, to any in the nightingale's song. It is true, the warble is desultory, but sweetly wild, and full of melody. The cadence rises and swells, then dies away in a soft, plaintive strain. Its shake, or trilling-note, is the finest we ever heard. A first-rate opera-singer might imi-

and the latter is admired for the loudness of its note, compared to the little body from whence it issues.*

All these soft-billed birds, thus prized for their singing, are rendered domestic, and brought up with assiduity by such as are fond of their voices in a cage. The same method of treatment serves for all, as their food and their habits are nearly the same.

CHAP. IV.

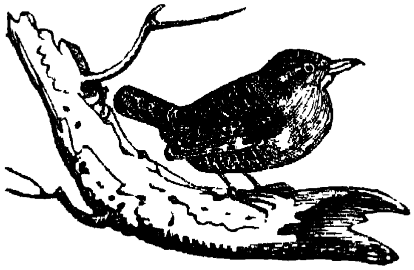
THE CANARY-BIRD AND OTHER HARD-BILLED SINGING-BIRDS.

(The Canary.)

THE CANARY-BIRD is now become so common, and has continued so long in a domestic state, that its native habits, as well as its native country, seem almost forgotten. Though, by the name, it appears that these birds came originally from the Canary Islands, yet we have it only from Germany, where they are bred up in great numbers, and sold into different parts of Europe. At what period they were brought into Europe is not well known, but it is certain that, about a century ago, they were sold at very high prices, and kept only for the amusement of

tate it; but, like all imitations, it would fall short of the original.—SYME.

THE WREN.— Speaking of wrens, the learned author of the Physicæ Curiosæ says,



(The Wren.)

they crowd into a cave during winter to increase their heat by companionship. The value of this author's testimony, however, may be estimated by his adding, that, when wrens are put upon a spit to roast, it turns of its own accord—a fact which he professes to have himself witnessed, in company with the celebrated Kircher, at Rome, they being commanded to try the experiment by a certain eminent Cardinal, who furnished the bird, and a hazel rod for a spit. At first they despaired of success, but just as Kircher, who had lost all patience, was going away, the spit (*mirabile dictu!*) began to turn slowly!

This pretty little bird, like the redbreast, frequently approaches the habitation of man, and enlivens the rustic garden with its song the greater part of the year. It begins to make a nest early in spring; and, what is peculiar in this bird, the materials of the nest are generally adapted to the place: if built beside a hay-rick, it is composed of hay; if against the side of a tree covered with white moss, it is made of that material; and with green moss, if against a tree covered with the same, or in a bank. Thus instinct directs it for security.

* THE GOLDEN-CRESTED WREN may be taken by striking the bough upon which it is sitting sharply with a stone or stick. The timid bird immediately drops to the ground, and generally dead. As their skins are tender, those who want them for stuffing will find this

the great. They have since been multiplied in great abundance; and their price is diminished in proportion to their plenty.*

In its native islands, a region equally noted for the beauty of its landscapes and the harmony of its groves, the canary-bird is of a dusky grey colour, and so different from those usually seen in Europe, that some have even doubted whether it be of the same species. With us they have that variety of colouring usual in all domestic fowls; some white, some mottled, some beautifully shaded with green; but they are more esteemed for their note than their beauty, having a high, piercing pipe—as, indeed, all those of the finch tribe have—continuing for some time in one breath without intermission, then raising it higher and higher by degrees, with great variety.

It is this that has rendered the canary-bird, next to the nightingale, the most celebrated songster; and, as it is more easily reared than any of the soft-billed birds, and continues its song throughout the year, it is rather the most common in our houses.

Canary-birds sometimes breed all the year round; but they most usually begin to pair in April and to breed in June and August. Those are said to be the best breeders that are produced between the English and the French.

The canary-bird, by being kept in company with the linnet or the GOLDFINCH, pairs and produces a mixed breed, more like the canary-bird, and resembling it chiefly in its song. Indeed, all this tribe with strong bills and piercing notes, and feeding upon grain, have the most strong similitude to each other, and may justly be supposed, as Buffon imagines, to come from the same original.† They all breed about the same time; they frequent the same vege-

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preferable to using the gun. White remarks, in his Natural History of Selborne, "that the golden-crested wren (the smallest British bird) will stand unconcerned till you come within three or four yards of it.—ARCANA OF SCIENCE, 1829.

* THE CANARY.—Buffon says, in his elegant manner, "that if the nightingale is the chauntress of the woods, the canary is the musician of the chamber; the first owes all to nature, the second something to art. With less strength of organ, less compass of voice, and less variety of note, the canary has a better ear, greater facility of imitation, and a more retentive memory; and as the difference of genius, especially among the lower animals, depends in a great measure on the perfection of their senses, the canary, whose organ of hearing is more susceptible of receiving and retaining foreign impressions, becomes more social, tame, and familiar:—is capable of gratitude, and even of attachment; its caresses are endearing; its little humours innocent, and its anger neither hurts nor offends. Its education is easy: we rear it with pleasure, because we are able to instruct it. It leaves the melody of its own natural note to listen to the melody of our voices and instruments. It applauds, it accompanies us, and repays the pleasure it receives with interest; while the nightingale, more proud of its talent, seems desirous of preserving it in all its purity—at least, it appears to attach very little value to ours, and it is with great difficulty it can be taught any of our airs. The canary can speak and whistle: the nightingale despises our words, as well as our airs, and never fails to return to its own wild wood-notes. The canary sings at all seasons, cheers us in the dullest weather, and adds to our happiness by amusing the young and delighting the recluse, charming the tediousness of the cloister and gladdening the soul of the innocent and captive."

† THE GOLDFINCH is easily tamed and easily taught, and its capability of learning the notes of other birds is well known; but the tricks it may be taught to perform are truly astonishing. A few years ago, the Sieur Roman exhibited his birds, which were goldfinches, linnets, and canaries. One appeared dead, and was held up by the tail or claw without exhibiting any signs of life; a second stood on its head with its claws in the air; a third imitated a Dutch milk-maid going to market, with a pail on her shoulders; a fourth mimicked a Venetian girl looking out at a window; a fifth appeared as a soldier, and mounted guard as a sentinel; and the sixth acted as a cannoneer, with a cap on its head, a firelock on its shoulder, and a match in its claw, and discharged a small cannon. The same bird also acted as if it had been wounded, &c.—SYME.

It appears to be a vain bird; for if a looking-glass is placed before it, the reflection of its own gay feathers seems greatly to delight it. The goldfinch is a long-lived bird. Willughby mentions one that lived twenty-three years in confinement. Grahame's sketch of this bird is worth quoting:—

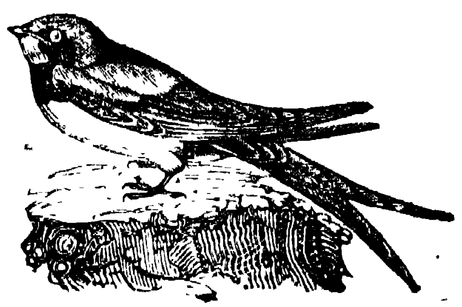
"The goldfinch weaves, with willow down inlaid
And cannach tufts, his wonderful abode,

tables; they build in the same hedges and trees; and are brought up for the cage with the same food and precautions. The linnet, the bullfinch, and the goldfinch, when we know the history of the canary-bird, have scarce any peculiarities that can attract our curiosity or require our care. The only art necessary, with all those that have no very fine note, is to breed them up under some more pleasing harmonist. The goldfinch learns a fine song from the nightingale; and the linnet and bullfinch may be taught, forgetting the wild notes of nature, to whistle a long and regular tune.

CHAP. V.

THE SWALLOW AND ITS AFFINITIES.

An idea of any one bird in the former classes will give us some tolerable conception of the rest. By knowing the linnet, or the canary-bird, we have some notion of the manners of the goldfinch; by exhibiting the history of the nightingale, we see also that of the blackcap or the titmouse. But the Swallow tribe seems to be entirely different from all the former: different in their form, different in their habits, and unlike in all the particulars of their history.


(The Swallow.)

In this tribe is to be found the Goatsucker, which may be styled a nocturnal swallow: it is the largest of this kind, and is known by its tail, which is not forked, like that of the common swallow. It begins its flight at evening, and makes a loud singular noise, like the whur of a spinning-wheel. To this also belongs the House-swallow, which is too well known to need a description; the Marten, inferior in size to the former, and the tail much less forked: it differs, also, in its nest, which is covered at top, while that of the house-swallow is open; and the Swift, rather larger than the house-swallow, with all the toes standing forward; in which it differs from the rest of its kind. All these resemble each other so strongly that it is not without difficulty the smaller kinds are known asunder.*

Sometimes suspended at the limber end
Of plane-tree spray, among the broad-leaved shoots
The tiny hammock swings to every gale;
Sometimes in closest thickets 'tis conceal'd;
Sometimes in hedge luxuriant, where the briar,
The bramble, and the plum-tree branch
Warp through the thorn, surmounted by the flowers
Of climbing vetch or honeysuckle wild."

* The Swallow.—This bird is a general favourite. He comes to us when Nature is putting on her most smiling aspect; and he stays with us through the months of sunshine and gladness.

"The swallow is one of my favourite birds, and a rival of the nightingale; for he glads my sense of seeing, as much as the other does my sense of hearing. He is a joyous prophet of the year, the harbinger of the best season; he lives a life of enjoyment amongst the loveliest forms of nature; winter is unknown to him, and he leaves the green meadows of England in autumn, for the myrtle and orange groves of Italy, and for the palms of Africa."—Sir H. Davy.

The sentiment is from Anacreon, and it is worthy of the joyousness of the old Grecian:

"Gentle bird! we find thee here
When Nature wears her summer vest;
Thou com'st to weave thy simple nest;
And when the chilling winter lowers,
Again thou seek'st the genial bowers
Of Memphis, or the shores of Nile,
Where sunny hours of verdure smile.'

The places which the swallow loves are consecrated too by our great dramatic poet, in one of his most characteristic passages;

THE SPARROW KIND.

These are all known by their very large mouths, which, when they fly, are always kept open: they are not less remarkable for their short, slender feet, which scarce are able to support the weight of their bodies; their wings are of immoderate extent for their bulk; their plumage is glossed with a rich purple; and their note is a slight twittering, which they seldom exert but upon the wing.

This peculiar conformation seems attended with a similar peculiarity of manners. Their food is insects, which they always pursue flying. For this reason, during fine weather, when the insects are most likely to be abroad, the swallows are for ever upon the wing, and seen pursuing their prey with amazing swiftness and agility. All smaller animals, in some measure, find safety by winding and turning, when they endeavour to avoid the greater: the lark thus evades the pursuit of the hawk; and man the crocodile. In this manner, insects upon the wing endeavour to avoid the swallow; but this bird is admirably fitted by nature to pursue them through their shortest turnings. Besides a great length of wing, it is also provided with a long tail, which, like a rudder, turns it in its most rapid motions; and thus, while it is possessed of the greatest swiftness, it is also possessed of the most extreme agility.

Early, therefore, in the spring, when the returning sun begins to rouse the insect tribe from their annual state of torpidity, when the gnat and the beetle put off their earthly robes and venture into air, the swallow then is seen returning from its long migration beyond the ocean, and making its way feebly to the shore. At first, with the timidity of a stranger, it appears but seldom, and flies but slowly and heavily along. As the weather grows warmer, and its insect supply increases, it then gathers greater strength and activity. But it sometimes happens that a rainy season, by repelling the insects, stints the swallow in its food; the poor bird is then seen slowly skimming along the surface of the ground, and often resting after a flight of a few minutes. In general, however, it keeps on the wing, and moving with a rapidity that nothing can escape. When the weather promises to be fair, the insect tribe feel the genial influence, and make bolder flights; at which time the swallow follows them in their aerial journeys, and often rises to imperceptible heights in the pursuit. When the weather is likely to be foul, the insects feel the first notices of it; and from the swallow's following low, we are often apprized of the approaching change.

When summer is fairly begun, and more than a sufficient supply for sustaining the wants of nature everywhere offers, the swallow then begins to think of forming a progeny. The nest is built with great industry and art; particularly by the common swallow, which builds it on the top of chimneys. The marten sticks it to the eaves of houses. The goat-sucker, as we are told, builds it on the bare ground. This nest is built with mud from some neighbouring brook, well tempered with the bill, moistened with water for the better adhesion, and still farther kept firm by long grass and fibres. Within it is lined with goose feathers, which are ever the warmest and the neatest. The marten covers its nest at top, and has a door to enter at; the swallow leaves hers quite open.*

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in which, after the turmoil of dark passions, and at the portals of the blood-stained castle of Macbeth, the mind is for a moment relieved by the contrast of pure feeling, springing from Shakspeare's deep love of nature, clothed in the most exquisite language.—Ed.

"This guest of summer,
The temple-haunting martlet, does approve
By his lov'd mansionry, that the heaven's breath
Smells wooingly here; no jetty, frieze, buttress,
Nor coign of vantage, but this bird hath made
His pendant bed, and procreant cradle; where they
Most breed and haunt, I have observed, the air
Is delicate." *Macbeth*

* Nests of Swallows.—Captain Carmichael, an intelligent and active observer, mentions the following fact respecting the natural history of swallows. Swallows are birds of passage at the southern extremity of Africa, as well as in Europe. They return to the Cape of Good Hope in the month of September, and quit it again in March and April. Captain Carmichael happened to be stationed for some time at the eastern extremity of the colony; a pair of these birds (*Hirundo capensis*) soon after their arrival, built their nest on the outside of the house

The swallow usually lays from five to six eggs, of a white colour speckled with red; and sometimes breeds twice a year. When the young brood are excluded, the swallow supplies them very plentifully, the first brood particularly, when she finds herself capable of producing two broods in a year. This happens when the parents come early, when the season is peculiarly mild, and when they begin to pair soon. Sometimes they find a difficulty in rearing even a single nest, particularly when the weather has been severe, or their nests have been robbed in the beginning of the season. By these accidents, this important task is sometimes deferred to the middle of September.

At the latter end of September they leave us; and for a few days previous to their departure, assemble, in vast flocks, on house-tops, as if deliberating on the fatiguing journey that lies before them. This is no slight undertaking, as their flight is directed to Congo, Senegal, and along the whole Morocco shore. There are some, however, left behind in this general expedition, that do not part till eight or ten days after the rest.* These are chiefly the latter weakly broods, which are not yet in a condition to set out: they are sometimes even too feeble to venture, till the setting in of winter; while their parents vainly exhort them to efforts which instinct assures them they are incapable of performing. Thus it often happens that the wretched little families, being compelled to stay, perish the first cold weather that comes; while the tender parents share the fate of their offspring, and die with their new-fledged brood.

Those that migrate are first observed to arrive in Africa, as Mr. Adanson assures us, about the beginning of October. They are thought to have performed their fatiguing journey in the space of seven days. They are sometimes seen, when interrupted by contrary winds, wavering in their course far off at sea, and alighting upon whatever ship they find in their passage. They then seem spent with famine and fatigue; yet still they boldly venture, when refreshed by a few hours rest, to renew their flight, and continue the course which they had been steering before.†

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wherein he lodged, fixing it against the angle formed by the wall with the board which supported the eaves. The whole of this nest was covered in, and it was furnished with a long neck, or passage, through which the birds entered and came out. It resembled a longitudinal section of a Florence oil flask. This nest having fallen down after the young birds had quitted it, the same pair, as he is disposed to believe, built again on the old foundation in the month of February following; but he remarked, on this occasion, an improvement in the construction of it, which can hardly be referred to the dictates of mere instinct. In building the first, the birds were satisfied with a single opening; but this one was furnished with an opening at each side, and came out at the other. One object obtained by this improvement, was saving themselves the trouble of turning in the nest, and thus avoiding any derangement of the interior economy. But the chief object appeared to be, to facilitate their escape from the attacks of serpents, which harbour in the roofs of thatched houses, or crawl up the walls, and not unfrequently devour both the mother and her young.

* Migration of Swallows.—The following are the days on which the migrations of swallows to and from the neighbourhood of Gosport have been successively observed for the last twelve years, by Dr. Burney: a proof of their wonderful instinct in regard to the changes that take place in the temperature of the atmosphere soon after the vernal and autumnal equinoxes:—

ARRIVAL.	DEPARTURE.	DIFFERENCE. weeks.	days.
1816, April 23	Not observed.		
1817 — 21	——		
1818 — 25	September 29	22	3
1819 — 22	October 1	23	1
1820 — 26	October 13	24	2
1821 — 15	October 8	25	1
1822 — 27	September 28	22	0
1823 — 23	Not observed.		
1824 — 18	October 18	26	1
1825 — 13	October 11	25	6
1826 — 18	September 27	23	1
1827 — 13	October 3	24	4

The greatest deviation in the time of their arrival is a fortnight, and in the time of their departure four weeks; which may be considered as regular, and in some instances more uniform, than the springs and falls of those years.

† Observations on the Chimney and Window Swallow.—Few migratory birds have attracted so much observation as these, chiefly on account of the regularity of their movements, and the proximity of their abode to the residence of man; but though thus offering themselves continually to his ob-

These are facts, proved by incontestible authority; yet it is a doubt whether all swallows migrate in this manner, or whether there may not be some species of this animal that, though externally alike, are so internally different, as to be very differently affected by the approach of winter. We are assured from

servation, a satisfactory account of their migrations, and of the motives of them, is far from being obtained as yet; nor is this likely to be the case, until the observations have been made for a longer period, and in different quarters of the world. For the furtherance of this object, the following notes are recorded:—

These birds, in crossing the Channel, reach the land near the shore, and in misty weather seem to have a difficulty in finding it; for I have been assured by intelligent fishermen, that when the weather is hazy, swallows, martens, swifts, and other birds, are accustomed to alight on their boats, at the distance of three or four leagues from land, either singly or in small flocks: at which time they appear so much fatigued, that the swallow is often only able to fly from one end of the boat to the other, when an attempt is made to seize it. The swallow and marten come either singly or in small parties, and, if they do not happen to be our own residents, soon pass on to their accustomed haunts; so that after two or three have been seen, it may perhaps be a fortnight before others make their appearance. In 1831, a single swallow was seen by a fisherman near the Eddystone, on the 4th of April; again, a company of four was seen on the 13th at sea, flying low, and making towards the land, at three o'clock P.M. Two martens were also seen on the 16th; but the first of either of these that I saw was on the 19th. Martens and swallows continued to fly on board fishing-boats, at the distance of ten leagues from land, through the whole of May; my last note of that circumstance being so late as the 28th of that month. There are rarely more than two or three in a company; and, considering that the wheatear and willow wren cross in safety, the state of fatigue in which they are seen is remarkable. One man informs me, that in fine weather he has often seen them drop on the water, flat and with the wings expanded, and presently after fly off again, as if refreshed.

The extraordinary confidence which these birds repose in man, in placing their nests among his dwellings, is worthy of notice, and explains a circumstance that is singular in the feathered race: I allude to the fact of their singing on their nests, which can only take place where there is no desire of concealment. The nest of the swallow is commonly in an unused chimney, but I have known it on the rafters of a deserted house; and at Trelawny a swallow has for several years found an entrance through a loophole in a turret, and fixed its nest against a chamber-door. The nest of the marten is placed under the eaves of houses, and the birds usually dedicate a few hours in the morning to the work, leaving it to dry during the remainder of the day; but I have known them neglect a fine morning, and carry on the work through the afternoon, from no other apparent reason than the facility of procuring mortar at that period from a small distance, in a place which in the morning was covered by the tide. In selecting a place for the nest, they are much influenced by its affording them a favourable *fall* in taking flight; and I have known them forsake a situation in which they had long been accustomed to build, only because a low wall had been erected in a situation that interfered with their comfortably taking flight.

Towards the end of the season these birds congregate, in rather large companies, on the roof of a house, or other favourable situation; from which some are continually taking flight, and to which others are perpetually returning. This congregation seems only to arise from a sociable disposition; yet it continues perhaps for six weeks, until the party is reduced by migration to a very small number.

My experience corroborates the remark, that the swallow tribe disappears earliest in the warmest seasons. This seems to be a mysterious circumstance, but may perhaps be explained by reference to the bodily constitution of the birds. It is well known that a certain temperature is necessary for hatching the eggs of birds, and that, if this be exceeded, the death of the embryo is the result. The temperature adapted to the incubation of most tropical birds appears to be too great for the eggs of the cuckoo and swallow. Under the direction, therefore, of a guiding Providence, which has implanted within them a sensibility of the due temperature, they pass into the northern regions at the proper season. When this great object has been accomplished, the body becomes fitted for another service. Birds that remain with us through the year require the warm temperature of autumn to enable them to moult. A degree of feverish action is necessary to this process; and by raising it artificially and prematurely, bird-catchers are known to accelerate the process of moulting. This fever, as in the disorder of the same name in the human body, is accompanied with a morbid sensibility, which renders painful those impressions of the air which before were pleasing. Instigated by these new sensations, they fly towards warmer many, and these not contemptible witnesses, the swallows hide themselves in holes under ground, joined close together, bill against bill, and feet against feet. Some inform us that they have seen them taken out of the water, and even from under the ice, in bunches, where they are asserted to pass the winter without motion.* Reaumer, who particularly interested himself in this inquiry, received several accounts of bundles of swallows being thus found in quarries and under the water. These men, therefore, have a right to some degree of assent, and are not to lose all credit from our ignorance of what they aver.†

All, however, that we have hitherto dissected, are formed within like other birds; and seem to offer no observable variety. Indeed, that they do not hide themselves under water, has been pretty well proved, by the noted experiment of Frisch, who tied several threads died in water-colours, round the legs of a great number of swallows, that were preparing for their departure: these, upon

regions; and, having there accomplished the natural process of renewing the plumage, a change of constitution again leads them to a cooler air. In many instances the marten has been known to remain late, for the purpose of feeding the young which have been slow to leave the nest; and, as the moulting fever does not commonly arise until the breeding constitution has ended, this does not usually produce inconvenience; but when the approach of the moulting constitution is felt before the young are able to fly, parental fondness yields to febrile excitement, and I have known them left to perish in the nest. It is easy, then, to imagine how a warm summer, by inducing the moulting fever early, causes their early departure; while a cold season delays them, by retarding it.

Jonathan Couch, Esq.—Mag. Nat. Hist.

* Submersion of the Swallow.—About ten years ago, I used to spend some weeks yearly at Sunbury, which is one of those pleasant villages lying on the Thames, near Hampton Court. In the autumn I could not help being much amused with those myriads of the swallow kind which assemble in those parts. But what struck me most was, that, from the time they began to congregate, forsaking the chimneys and houses, they roosted every night in the osier-beds of the aits of that river. Now this resorting towards that element, at that season of the year, seems to give some countenance to the northern opinion (strange as it is) of their retiring under water. A Swedish naturalist is so much persuaded of that fact, that he talks, in his Calendar of Flora, as familiarly of the swallow's going under water in the beginning of September, as he would of his poultry going to roost a little before sunset*—Natural History of Selborne: Edited by Browne.

† Torpidity of Swallows.—As to swallows (*hirundines rusticæ*) being found in a torpid state during the winter in the Isle of Wight, or any part of this country, I never heard any such account worth attending to. But a clergyman of an inquisitive turn assures me that, when he was a great boy, some workmen, in pulling down the battlements of a church tower, early in the spring, found two or three swifts (*hirundines apodes*) among the rubbish, which were, at first appearance, dead; but, on being carried towards the fire, revived. He told me that, out of his great care to preserve them, he put them in a paper bag, and hung them by the kitchen fire, where they were suffocated.

Another intelligent person has informed me that, while he was a schoolboy at Brighthelmstone, in Sussex, a great fragment of the chalk cliff fell down one stormy winter on the beach, and that many people found swallows among the rubbish; but on my questioning him whether he saw any of those birds himself, to my no small disappointment he answered me in the negative, but that others assured him they did.†

Natural History of Selborne.

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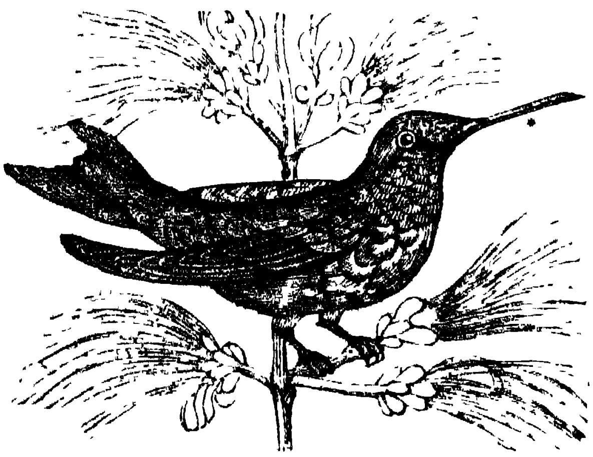
* Our author seems strongly inclined to the doctrine of the submersion of the swallow tribe during winter; but the temperature of places situated at great depths below the surface of the land and water, is sufficient objection to the circumstance of birds remaining in a torpid state, during the winter, in solitary caverns, or at the bottom of deep lakes, as many authors have affirmed.—It is an established fact, that all places situated eighty feet below the surface of the earth are constantly of the same temperature. In these situations, therefore, the sun can have no influence, and what else would call forth the dormant organs of these birds into action? It is but reasonable to conclude that cold, which kept them benumbed by its sleepy torpor, would evidently perpetuate their slumbers.—Ed.

† That a few solitary instances of swallows remaining in this country, in a state of torpidity, have occurred, there can be little doubt; but that they generally hybernate is out of the question. Charles Lucian Bonaparte, in a letter to the Secretary of the Linnæan Society, dated from on board the Delaware, near Gibraltar, March 20, 1828, says—"A few days ago, being five hundred miles from the coasts of Portugal, and four hundred from those of Africa, we were agreeably surprised by the appearance of a few swallows (*hirundo urbica* and *rustica*.) This, however extraordinary, might have been explained by an easterly gale, which might have cut off the swallows migrating from the main to Madeira, only two hundred miles distant from us; but what was my s prise in observing several small warblers p about the deck and rigging. These poor strangers were soon caught and brought to me." These warblers were the *sylvia trochilus*, or hay-bird, &c.—Ed.

their return the ensuing summer, brought their threads back with them, no way damaged in their colour—which they most certainly would, if, during the winter, they had been steeped in water. Yet still this is a subject on which we must suspend our assent, as Klein, the naturalist, has brought such a number of proofs, in defence of his opinion, that swallows are torpid in winter, a even the most incredulous must allow to have some degree of probability.

CHAP. VI.

THE HUMMING BIRD AND ITS VARIETIES.



(The Humming Bird.)

Having given some history of the manners of the most remarkable birds of which accounts can be obtained, I might now go to a very extensive tribe, remarkable for the splendour and the variety of their plumage; but the description of the colours of a beautiful bird has nothing in it that can inform or entertain; it rather excites a longing, which it is impossible for words to satisfy. There is one species, however, that I will illustrate the history of this class with; as though the least, it will certainly be allowed the most beautiful of all others. In quadrupeds, the smallest animals are noxious, ugly, and loathsome. The smallest of birds are the most beautiful, innocent, and sportive. Of all those that flutter in the garden, or paint the landscape, the **Humming-bird** is the most delightful to look upon, and the most inoffensive.

Of this charming little animal there are six or seven varieties, from the size of a small wren, down to that of a humble-bee. The smallest humming-bird is about the size of an hazel-nut. The feathers on its wings and tail are black; but those on its body, and under its wings, are of a greenish brown, with a fine red cast or gloss, which no silk or velvet can imitate. It has a small crest on its head, green at the bottom, and, as it were, gilded at the top, and which sparkles in the sun like a little star in the middle of its forehead. The bill is black, straight, slender, and of the length of a small pin. The larger humming-bird is near half as big as the common wren, and without a crest on its head; but, to make amends, it is covered, from the throat half way down the belly, with changeable crimson-coloured feathers, that, in different lights, change to a variety of beautiful colours, much like an opal. The heads of both are small, with very little round eyes, as black as jet.

It is inconceivable how much these add to the high finishing and beauty of a rich, luxurious, western landscape. As soon as the sun is risen, the humming-birds, of different kinds, are seen fluttering about the flowers, without ever lighting upon them. Their wings are in such rapid motion, that it is impossible to discern their colours, except by their glittering. They are never still, but continually in motion, visiting flower after flower, and extracting its honey, as if with a kiss. For this purpose they are furnished with a forky tongue, that enters the cup of the flower, and extracts its nectared tribute: upon this alone they subsist. The rapid motion of their wings brings out a humming sound, from whence they have their name; for whatever divides the air swiftly, must thus produce a murmur.*

The nests of these birds are not less curious than the rest: they are suspended in the air, at the point of the twigs of an orange, a pomegranate, or a citron tree; sometimes even in houses, if they find a small and convenient twig for the purpose. The female is the architect, while the male goes in quest of materials—such as cotton, fine moss, and the fibres of vegetables. Of these materials a nest is composed, of about the size of a hen's egg cut in two, admirably contrived, and warmly lined with cotton. They lay two eggs at a time, and never more, about the size of small peas, and as white as snow, with here and there a yellow speck. The male and the female sit upon the nest by turns, but the female takes to herself the greatest share. She seldom quits the nest, except a few minutes in the morning and evening, when the dew is upon the flowers, and their honey in perfection. During this short interval the male takes her place; for as the egg is so small, the exposing it ever so short a time to the weather would be apt to injure its contents; the surface exposed being so great in comparison to the bulk. The time of incubation continues twelve days: at the end of which the young ones appear, much about the size of a blue-bottle fly. They are at first bare; by degrees they are covered with down; and, at last, feathers succeed, but less beautiful at first than those of the old ones.

These birds, on the continent of America, continue to flutter the year round: as their food, which is the honey of flowers, never forsakes them in those warm latitudes where they are found.† But it is otherwise in the islands of the Antilles, where, when the winter season approaches, they retire, and, as some say, continue in a torpid state during the severity of that season. At Surinam and Jamaica, where they constantly have flowers, these beautiful birds are never known to disappear.

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* Suction.—From the circumstance of humming-birds frequenting flowers, and thrusting their needle-formed bills into the blossoms, as bees and butterflies do their suckers (*haustella*), it has hastily been concluded by naturalists, that, like these insects, they feed on honey. But if such naturalists had paused for a moment to consider the form of the bill and the tongue in the trochilidae, their conclusions would not perhaps have been so hasty. The trophi of insects which feeds on the honey of flowers, are beautifully adapted for procuring it by suction, which is commonly indispensable, the honey being in most cases spread thinly over the surface of the nectary or the ungulae of the petals, and not in quantities such as it might be drunk like water. Now it is a fact, which is or may be well known, that birds have almost no power of suction, in consequence of the narrowness and rigidity of their tongues—as may be seen when they drink, having to hold up their heads, and depend upon the weight of the water for transmitting it into the craw. Nobody, as far as we know, has described the humming-bird drinking the honey from flowers in this manner; and, indeed, its tenacity and glutinous nature would entirely preclude this. Such reasons would dispose us, therefore, to conclude, that the trochilidae do not feed on honey, though we did not possess irresistible proofs of the fact, that they feed on insects. Wilson, the distinguished author of the American Ornithology, found, upon repeated dissection, that the *trochilus colubris* had a quantity of insects in its stomach; and the eccentric Waterton affirms that humming-birds feed on insects.—Rennie.

† Nidification and Food.—White, in his Natural History of Selborne, says, "In the season of nidification, the wildest birds are comparatively tame." This observation applies to the humming-bird. "I remember," says a correspondent of the Magazine of Natural History, "a pair of these beautiful little creatures busily building a nest in the branch of an orange-tree, which was close to the outer side of the open piazza of a house in Spanish Town, Jamaica: in this apartment, situated on the north side of the house, the family breakfasted and lunched. I spent three days there; and, while taking my meals, had at least an equal treat, in seeing these smallest of the feathered tribes gaily and actively employed in their building process. I have now in my possession a nest of the bee humming-bird, which I removed from the end of a mango-tree (*Mangiferia indica*), which was not a foot above my head, and close to the door of a dwelling-house. I cannot quit this article without speaking of the delight that was afforded me, in Jamaica, by seeing humming-birds feeding on honey, in the florets of the great aloe (*Agave americana, L.*) On the side of a hill upon Sutton's Estate were a considerable number of aloe plants, of which about a dozen were in full blossom. They were spread over a space of about twenty yards square. The spikes bearing bunches of flowers in a thyrsus, were from twelve to fifteen feet high; on each spike were many hundred flowers, of a bright yellow colour, each floret of a tubular shape,

The Indians formerly made great use of this pretty bird's plumage, in adorning their belts and head-dress. The children take them in the fields upon rings

and containing a good-sized drop of honey. Such an assemblage of floral splendour was in itself most magnificent and striking; but it may be imagined how much the interest caused by this beautiful exhibition was increased, by vast numbers of humming-birds, of various species, fluttering at the opening of the flowers, and dipping their bills, first into one floret, and then into another—the sun, as usual, shining bright upon their varied and beautiful plumage. The long-tailed or bird of Paradise humming-bird was particularly striking, its long feathers waving as it darted from one flower to another. I was so much delighted with this sight, that I visited the spot again in the afternoon, after a very long and fatiguing day's ride, accompanied by my wife, on horseback, when we enjoyed the scene before us for more than half an hour.

In the Natural History Magazine, there is a note furnished by Mr. Rennie, respecting the food of the humming-bird. Mr. Rennie is of opinion that the Trochilidæ do not feed on honey, but that their food is insects. I have related what appeared to be a fact, in proof of the general opinion of their eating honey being correct. I gathered a bunch of the flowers of the aloe, but did not perceive any insects in them; and I have known several instances of humming-birds being kept alive for some time by feeding them with sugar and water: further, when birds make insects their prey, it is by a sudden darting upon them; whereas the humming-bird is fluttering some seconds at each flower, as if employed in sipping honey, rather than in catching insects.

THE RED-THROATED HUMMING-BIRD—These humming-birds cannot support the total deprivation of liquid honey for more than twelve or fourteen hours at the most;* and they frequently die from this cause in the autumn; when, if they have been detained by a late brood beyond the proper period of their departure, and the flowers are destroyed by early frosts, the elasticity of their wings is weakened by the want of nourishment. The movements of the bird are no longer executed with that velocity which holds it suspended over the blossom that contains its food. The more their want increases, the more their powers diminish: they frequently alight, they fly less swiftly, they rest themselves on the ground, languish, and die. Their young, when hatched late in the season, are exposed to this danger, and may frequently be met with in the autumn perishing in this way.

The difficulty of obtaining these beautiful birds, without injuring their plumage, has given rise to the invention of several different modes of catching them. Some drown them by means of a syringe; others kill them with a pistol loaded with sand; and, indeed, when very near to them, the explosion of the powder is sometimes sufficient to stun them and bring them to the ground. It scarcely need be observed, that even the very finest shot should not be used in the pursuit of these small birds, for a single grain would shatter them, and leave only a wreck of their beauties. These plans are but ill-adapted to their object, as water injures the feathers of the bird, and sand makes it fall to the ground. I have, therefore, had recourse to two other methods; I have employed with success the net called spider's web, with which I surrounded the shrubs at the distance of a foot or two. The bird cleaves the air with such rapidity that it has not time to perceive the net, and is thus easily caught. I have also made use of green gauze, in the shape of a butterfly-net; but this method requires much patience, and can only be employed on plants and small shrubs. The person must be carefully concealed; for although the bird will approach very near, it is not the less distrustful; and if any strange object should excite his suspicion, he quits the flower, rises about a foot above the plant, remains there perfectly stationary, examines the object which disturbs him, and when he has ascertained that his fear is well-founded, he utters a cry and disappears. To have any degree of success in this pursuit, a little niche must be constructed, as low as possible, with plants and surrounding shrubs, from which the bird may be covered with the net, in the same way that a butterfly is caught.

Lastly, having observed that these birds often perched upon the dead branches of shrubs, and wishing to behold in the sun and on the living animal, all the beauty of a plumage resplendent with a thousand hues, the brilliancy of which is tarnished by the hand of death, I inserted some small sticks into the flowers, upon which they perched. I had thus for a minute the pleasure of smeared with bird-lime: they approach the place where the birds are flying, and twirling their rings in the air, so allure them, either by the colour or the sound, that the simple little creature comes to rest upon the ring, and is seized. They are then instantly killed and gutted, and hung up in the chimney to dry.*

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* Audubon observes, that the humming-bird is insectivorous, and that it inserts its bill into the flowers in order to extract the minute insects that live in their interior, and thus relieves them from these enemies; and that they also catch many small flies while on the wing. He says, "The nectar or honey which they sip from the different flowers, being of itself insufficient to support them, is used more as if to allay their thirst."

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seeing them dart their tongue into the nectar-bearing cup, to draw from it a liquor suited to the delicacy of their organs.

This bird places its nest on trees and shrubs: the inside consists of the brown down of the sumac, and the outside is covered with lichens. The one which I have preserved was on a small branch of the red cedar. The male brings the materials, and the female arranges them; two eggs are laid of a size proportioned to that of the bird, and each parent sits alternately.—M. Vieillot, (*Ois Dorrés.*)

* Habits; Economy.—The best accounts of the habits and economy of the humming-birds are those given by Wilson and Audubon, in their histories of the northern or ruby-throated humming-bird; and by Bullock, of several species in the islands of Jamaica and in Mexico. And from the little we have been able to glean from other writers, there appears to exist great similarity in their manners. They are of a lively and active disposition, almost constantly on the wing, and performing all their motions with great rapidity. Their flight is in darts; and it is at this time, in a brilliant sun, that the variations of their plumage are displayed with the greatest advantage.

"Each rapid movement gives a lessened dye;
Like scales of burnish'd gold they dazzling show,
Now sink to shade—now like a furnace glow."

But when performing a lengthened flight, as during migration, they pass through the air in long undulations—raising themselves for some distance, and then falling in a curve. When about to feed, or in search of a favourite flower, they hover stationary, surveying all around, and suddenly dart off to the object. "I have often stopped," says Wilson, "with pleasure, to observe their manœuvres among the blossoms of a trumpet-flower. When arrived before a thicket of these, that are in full bloom, he poises or suspends himself on wing, for the space of two or three seconds, so steadily, that his wings become invisible, or only like a mist." They are also possessed of boldness and familiarity. Wilson has seen them attack and teaze the king-bird; and among themselves they are exceedingly pugnacious: two males seldom meeting on the same bush or flower without a battle. In the gardens they flutter about without heeding intruders.

The intrepidity and jealousy of a diminutive Mexican species (*T. cyanopogon*—Mexican star), according to Mr. Bullock, far exceeds the great courage of the northern birds. "When attending their young, they attack any bird indiscriminately that approaches their nest. Their motions, when under the influence of anger or fear, are very violent, and their flights rapid as an arrow. The eye cannot follow them; but the shrill, piercing shriek which they utter on the wing may be heard when the bird is invisible, and often led to their destruction by preparing me for their approach. They attack the eyes of the larger birds; and their sharp, needle-like bill is a truly formidable weapon in this kind of warfare. Nothing can exceed their fierceness when one of their own species invades their territory during the breeding season; under the influence of jealousy they become perfect furies; their throats swell; their crests, tails, and wings expand; they fight in the air, uttering a shrill noise, till one falls exhausted to the ground."

The desire to possess creatures of such beauty in a tame state has induced persons often to try the experiment of keeping them in cages, though yet comparatively without success. The attempts which have been made, however, do not preclude a possibility by perseverance, of ever bringing them to this country. Bullock said that he had nearly seventy in cages—that no bird was ever more easily reconciled to its new situation, and that by attention they might easily have been brought to Europe. We learn also from Azara, Wilson, and other sources, that they have been frequently kept in their native countries, for several months on sugar or honey and water, assisted by the insects which were attracted by and drowned in the sweets; and Charles Peale, proprietor of the Philadelphia Museum, reared two from the nest, which became so tame as to perch on Mrs. Peale's shoulder.

A mango humming-bird was successfully brought to England some years ago. "A young gentleman, a few days before he sailed from Jamaica for England, met with a female humming-bird sitting on the nest and eggs; and cutting off the twig, he brought altogether on board. The bird became sufficiently tame to suffer herself to be fed on honey and water during the passage, and hatched two young ones. The mother, however, did not long survive, but the young were brought to England, and continued for some time in the possession of Lady Hammond. The little creatures readily took honey from the lips of Lady Hammond; and though the one did not live long, the other survived for at least two months from the time of their arrival."

Sir W. Jardine.

CHAP. I.

BIRDS OF THE CRANE KIND IN GENERAL.

THE progressions of Nature, from one class of beings to another, are always by slow and almost imperceptible degrees. She has peopled the woods and the fields with a variety of the most beautiful birds; and, to leave no part of her extensive territories untenanted, she has stocked the waters with its feathered inhabitants also: she has taken the same care in providing for the wants of her animals in this element, as she has done with respect to those of the other; she has used as much precaution to render water-fowl fit for swimming, as she did in forming land-fowl for flight; she has defended their feathers with a natural oil, and united their toes by a webbed membrane—by which contrivances they have at once security and motion. But between the classes of land-birds that shun the water, and of water-fowl that are made for swimming and living on it, she has formed a very numerous tribe of birds, that seem to partake of a middle nature; that, with divided toes, seemingly fitted to live upon land, are at the same time furnished with appetites that chiefly attach them to the waters. These can properly be called neither land-birds nor water-fowl, as they provide all their sustenance from watery places, and yet are unqualified to seek it in those depths where it is often found in greatest plenty.

This class of birds, of the crane kind, are to be distinguished from others rather by their appetites than their conformation. Yet even in this respect they seem to be sufficiently discriminated by Nature: as they are to live among the waters, yet are incapable of swimming in them, most of them have long legs, fitted for wading in shallow waters, or long bills proper for groping in them.

Every bird of this kind, habituated to marshy places, may be known, if not by the length of its legs, at least by the scaly surface of them. Those who have observed the legs of a snipe or a woodcock, will easily perceive my meaning; and how different the surface of the skin that covers them is from that of the pigeon or the partridge. Most birds of this kind also are bare of feathers half way up the thigh—at least, in all of them, above the knee. Their long habits of wading in the waters, and having their legs continually in moisture, prevents the growth of feathers on those parts; so that there is a surprising difference between the leg of a crane, naked of feathers almost up to the body, and the falcon, booted almost to the very toes.

The bill also is very distinguishable in most of this class. It is, in general, longer than that of other birds, and in some finely fluted on every side; while at the point it is possessed of extreme sensibility, and furnished with nerves, for the better feeling their food at the bottom of marshes, where it cannot be seen. Some birds of this class are thus fitted with every convenience: they have long legs, for wading; long necks, for stooping; long bills, for searching; and nervous points, for feeling. Others are not so amply provided for: as some have long bills, but legs of no great length; and others have long necks, but very short legs. It is a rule which universally holds, that where the bird's legs are long, the neck is also long in proportion. It would indeed be an incurable defect in the bird's conformation, to be lifted upon stilts above its food, without being furnished with an instrument to reach it.

All this class live upon fish or insects, one or two only excepted: even those that are called mudsuckers, such as the snipe and the woodcock, it is more than probable, grope the bottom of marshy places only for such insects as are deposited there by their kind, and live in a vermicular state, in pools and plashes, till they take wing, and become flying insects.

In treating of this class of birds, it will be best to observe the simplest method possible: neither to load the memory with numerous distinctions, nor yet confuse the imagination, by a total want of arrangement. I will, therefore, describe some of the largest sorts separately—as in a history of birds, each of these demands peculiar distinction. The crane, the stork, the Balearic crane, the heron, the bittern, with some others, may require a separate history. Some particular tribes may next offer, that may very naturally be classed together; and as for all the smaller and least remarkable sorts, they may be grouped into one general description.*

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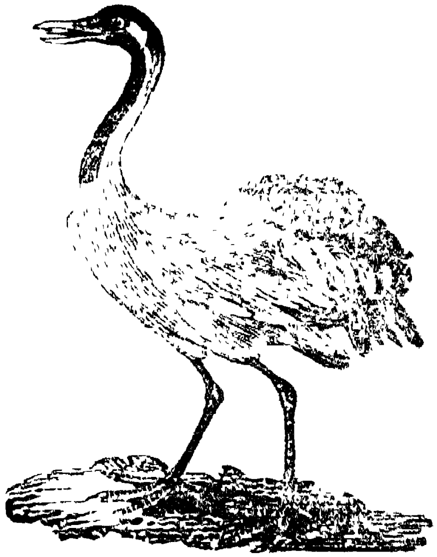
* Birds Washing.—A great number of birds are fond of washing their plumes, by throwing water over them with their beaks, and even dipping their bodies in ponds or streams. So universal is this habit, that it is taken advantage of on the Continent to entrap wild birds by means of what is called an *Abreuvoir*. "Nothing," says M Bechstein, "can be more agreeable during the hot weather of summer, than the sport thence arising, while seated tranquilly under the shade of thick foliage, by the side of a slow-running brook. According to the extent of the place, a net, from three to six feet long, by three or four feet in width, is extended over a rill which has been dug expressly for conducting the water of the adjoining stream. A number of rods, about an inch in diameter, are stuck in this rill upon a level with the water, where rings are fixed, to prevent the net from being wetted—the remainder of the little canal being covered over with boughs. When the place is well chosen, it will be surrounded all day long, but particularly early in the morning and near sunset, the time for beginning to place the net being about the middle of July.

Mr. Knapp mentions the linnet (*Linaria Linota*) as the cleanliest of birds in this respect,—since it delights to dabble in the water, and dress its plumage in every rill that runs by; but we do not think the linnet washes more frequently than any of the other smaller birds (*Sylvicolæ*, Vieillot). The linnet, the chaffinch, and all the seed-eating birds, indeed, we have remarked to wash less frequently than the slender-billed birds (*Sylviadæ*, Vigors), to which washing seems almost as necessary as food and air These are accordingly among the most frequent captures in the *Abreuvoirs*, as we learn from M. Bechstein: and in water near their haunts we see them every day assiduously bathing. In confinement, again, they wash much oftener than the seed-eaters. A red-breast, which we at present possess, will wash at any hour of the day or night when he is furnished with water; and his feathers are scarcely dry before he is eager to renew his bath which he would do, if permitted, a dozen times a day; while a goldfinch in a neighbouring cage does not care about washing above once or twice a week. A fine black-cap, which is also in our possession, is nearly as fond of frequent washing as the red-breast. Mr. Sweet finds that when his more tender birds are allowed to wash as often as they would do, particularly in winter, it is apt to prove injurious, and sometimes fatal.

"One of the most remarkable propensities that manifest themselves in young birds (says the Hon and Rev W. Herbert,) is the ardent desire of washing themselves, in some species, and of dusting themselves, in others, as for instance in the common wren. This, I conceive, must be an instinctive incitement. It is barely possible that the little wrens might see through the aperture of their covered nest the parents dusting themselves on the ground in some instances; but their nests are often placed where this could not be perceived; and the desire is equally powerful in all individuals. On the other hand, the nests of the wood-wren and many others which wash themselves eagerly on the first opportunity that presents itself after they can feed themselves, could never have seen the like, their nest having been situated under the roots of a tree, upon a dry bank in a wood. This impulse is, therefore, inspired by the Creator; and it is inspired with a force that in captivity is like unto madness. It is very injurious to a nightingale to wash in the winter, and it is fatal to it to do so often; yet the moment a pan of water is put into its cage, it rushes into the water and soaks itself, and then stands shivering the very image of chilliness and despair; yet will it eagerly repeat the operation, if allowed to do so, every day till it dies. Young whinchats, sedge-warblers, wood-wrens, yellow wrens, &c., as soon as they can feed themselves, if offered water in a cage, wash with similar avidity; yet if the temperature be much under 70°, and the sun not shining, it is sure to kill them. In the younger birds it produces, some hours after, and perhaps the next day, a sudden stroke of palsy, by which they drop with a scream, having lost the use of one or both legs, and often with their mouths distorted. In this state the general health does not seem to be affected; but if both legs are paralyzed, they must soon perish. At a little more advanced age, the consequence of a single washing in cool weather is epileptic fits, which are repeated at shorter intervals till they occasion death. In a state of liberty the bird would dry itself quickly, by rubbing against the leaves and by very active motion, in the same manner as the wrens, by perpetual activity resist the

CHAP. II.

THE CRANE.


(The Crane.)

There is something extraordinary in the different accounts we have of bird's size and dimensions. Willughby and Pennant make the **Crane** from five to six feet long, from the tip to the tail; other accounts say that it is above five feet high; and others that it is as tall as a man. The Crane, taking its dimensions from Brisson, is exactly three feet four inches from the tip to the tail, and four feet from the head to the toe. It is a tall, slender bird, with a long neck and long legs. The top of the head is covered with black bristles, and the back of it is bald and red, which sufficiently distinguish this bird from the stork, to which it is very nearly allied in size and figure. The plumage, in general, is ash coloured; and there are two large tufts of feathers, that spring from the pinion of each wing: these bear a resemblance to hair, and are finely curled at the ends, which the bird has the power of erecting and depressing at plea-

severest frost, of which the least attack would kill them in confinement; and, probably, when birds have opportunities of washing always at hand, they choose the most favourable moments. In a cage it is necessary to give such birds their water in a very narrow-mouthed fountain, to prevent their killing themselves by washing. They will repeat it with equal eagerness, if not prevented, until they die, so strong is the inward impulse. I think the desire of washing belongs most strongly to the birds which migrate to hotter climates in winter—that of dusting to those which remain with us; a substitution wise as all the dispensations of the Creator; for if the little wren in winter were to wash in cold water instead of dusting, it must perish from the chill."

The largest birds of prey are no less fond of washing, though they care so little for water to drink that it has been erroneously asserted they never drink. "What I observed," says the Abbé Spallanzani, "is, that eagles, when left even for several months without water, did not suffer the smallest inconvenience from the want of it, but when they were supplied with water, they not only got into the vessel and sprinkled their feathers like other birds, but repeatedly dipped their beak, then raised their head in the manner of common fowls, and swallowed what they had taken up: hence it is evident that they drink. For the eagle it was necessary to set the water in a large vessel, otherwise by its attempts to drink, the vessel was sure to be overturned."

In books of falconry, also, directions are given for furnishing the birds with water to bathe. "Having weaned your hawk," says Willughby, "from her ramageness, she being both ways lured, thoroughly reclaimed, and likewise in good case, offer her some water to bathe herself in, in a basin wherein she may stand up to the thighs, choosing a temperate clear day for that purpose. Having lured your hawk, and rewarded her with warm meat, in the morning carry her to some bank, and there hold her in the sun till she hath endued her gorge, taking off her hood, that she may preen and pick herself, that being done, hood her again and set her near the basin, and taking off her hood, let her bathe as long as she pleases; after this take her up, and let her pick herself as before, and then feed her. If she refuses the basin to bathe in, show her some small river or brook for that purpose. By this use of bathing she gains strength and a sharp appetite, and thereby grows bold; but that day wherein she batheth give her no washed meat. If you would make your falcon upwards, the next day after she hath bathed get on horseback, either in the morning or evening, and choose out some field wherein are no rooks sure. Gesner says that these feathers, in his time, used to be set in gold, and worn as ornaments in caps.*

Such are the dimensions of a bird, concerning which, not to mention modern times, there have been more fables propagated than of any other.

The crane is a very social bird, and they are seldom seen alone. Their usual method of flying or sitting is in flocks of fifty or sixty together; and while a part feed, the rest stand like sentinels upon duty. The fable of their supporting their aged parents may have arisen from their strict connubial affection.

However this may be, the crane is a wandering, sociable bird, that, for the most part, subsists upon vegetables; and is known in every country of Europe except our own. There is no part of the world, says Belonious, where the fields are cultivated, that the crane does not come in with the husbandman for a share in the harvest. As they are birds of passage, they are seen to depart and return regularly at those seasons when their provision invites or repels them.

Our own country is free from their visits; not but that they were formerly known in this island, and held in great estimation, for the delicacy of their flesh: there was even a penalty upon such as destroyed their eggs; but, at present, they never go so far out of their way.

The cold arctic region seems to be this bird's favourite abode. They come down into the more southern parts of Europe rather as visitants than inhabitants: yet it is not well known in what manner they portion out their time to the different parts of the world. The migrations of the field-fare or thrush are obvious and well known; they go northward or southward in one simple track; when their food fails them here, they have but one region to go to. But it is otherwise with the crane; he changes place, like a wanderer: he spends the autumn in Europe; he then flies off, probably to some more southern climate, to enjoy a part of the winter; returns to Europe in the spring; crosses up to the north in summer; visits those lakes that are never dry; and then comes down again, to make depredations upon our cultivated grounds, in autumn.

In these journeys it is amazing to conceive the heights to which they ascend when they fly. Their note is the loudest of all other birds; and that is often heard in the clouds when the bird itself is entirely unseen. As it is light for its size, and spreads a large expanse of wing, it is capable of floating at the greatest height where the air is lightest; and as it secures its safety, and is entirely out of the reach of man, it flies in tracts which would be too fatiguing for any other

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or pigeons; then take your lure well garnished on both sides, and having unhooded your hawk, give her a bit or two on the lure, then hood her; afterwards go leisurely against the wind, then unhood her, and before she bate or find any check in her eye, whistle her off from your fist fair and softly."—Habits of Birds.

* The Gigantic Crane.—This is a very large species, which belongs to the stork genus, measuring, from tip to tip of the wings, nearly fifteen feet. The bill is of vast size, nearly triangular, and sixteen inches round at the base. The legs and half the thighs are naked, and the naked parts are full three feet in length. This bird is an inhabitant of Bengal and Calcutta, and is sometimes found on the coast of Guinea. It arrives in the internal parts of Bengal before the period of the rains, and retires as soon as the dry season commences. Its aspect is filthy and disgusting; yet it is one of the most useful birds of these countries, in clearing them of snakes and noxious reptiles and insects. It seems to finish the work began by the jackal and vulture—they clearing away the flesh of animals, and these birds removing the bones, and swallowing them entire. They sometimes feed on fish; and one of them will generally devour as much as would serve four men. On opening the body of a gigantic crane, a land-tortoise ten inches long, and a large black male cat, were found entire within it: the former in the craw, and the latter in the stomach. Being altogether undaunted at the sight of mankind, they are soon rendered familiar; and when fish or other food are thrown to them, they catch them very nimbly, and immediately swallow them whole.

The gigantic cranes are believed by the Indians to be animated by the souls of the Brahmins, and consequently to be invulnerable. Mr. Ives, in attempting to kill some of them with his gun, missed his shot several times, which the by-standers observed with the greatest satisfaction, telling him triumphantly that he might shoot at them as long as he pleased, but he never would be able to kill them.

birds to move forward in.* In these aërial journeys, though unseen themselves, they have the distinctest vision of every object below. They govern and direct their flight by their cries; and exhort each other to proceed or to descend when a fit opportunity offers for depredation.

* MIGRATION OF BIRDS. — No subject connected with natural history is so interesting, or has been so much the topic of meditation, as the periodical migration of the feathered race: these instinctive phenomena have been observed in all ages, and in all ages have alike led the mind up to that Almighty Power, which, impelling the birds of the air "from zone to zone, guides through the boundless sky their certain flight." The sages of old, as well as the scientific of the present day, have equally considered the subject to be worthy their especial attention.

The migration of birds is twofold, northwards and southwards; or, in other words, there is, in our latitudes at least, a periodical ebb and tide of spring and winter visiters.

When the daisy, and the cowslip, and the violet, "and ladye-smocks, all silver white," enamel our meadows, a multitude of birds, whose voices tell of spring, appear, new-sprung as it were into existence. Gradually, with the advance of the season, have they been working their way from the regions of the south, where, during our frozen winter, they have enjoyed food and warmth; but they are still our birds, for here they build their nests and rear their young, and return, many at least, year after year, to their old and well-tried haunts. Our summer birds of passage are mostly insectivorous, or live upon that kind of food which they find it impossible to procure during the severities of winter; in addition to which, they are incapable of sustaining a low degree of temperature; hence the necessity of their seeking not only a region where their wants may be supplied, but a latitude the temperature of which shall be, while they remain there, congenial to their nature. There is one singular fact, connected with the arrival of our welcome visiters, not easy to account for; it is this—the males appear in our woodlands several days, sometimes a week or two, before the females join them; and it would seem as if they came to look out for a fit spot, deep glen or hawthorn hedge, to which to invite their expected mates; for their notes of call are heard in every direction. Of this fact the bird-catchers are well aware, and prepare their traps accordingly; and it is often the fate of the nightingale to be snared on his first arrival, and to be destined to lead a life, short, indeed, of miserable captivity. Besides the nightingale, the black-cap, the garden-warbler, the white-throat, the willow-wrens, the wheatear, the swallow, the cuckoo, "darling of the spring," and many more, whose mingled voices swell great nature's hymn of praise to the God of seasons, are in the list of our periodical visiters. All these are mainly insectivorous. We shall, however, notice two birds particularly, which are not insectivorous, but which yet visit our latitudes in spring. And first, the stork (*Ciconia alba*)—"the stork in the heaven knoweth her appointed times." This bird, though seldom visiting the British isles, and never breeding with us, is one of the migratory tribe, too remarkable to be passed over. Holland is its favourite summer residence, but some parts of France, Germany, and Sweden, are also favoured with its presence.

The stork belongs to the family of *ardeidæ*, a group distinguished by their peculiar adaptation for the marshes and swamps they inhabit, having the bill, neck, and legs, elongated, so as to enable them to wade in pursuit of their food, which consists of fishes and aquatic reptiles, the whole structure of the body being modified accordingly. The gentle and social disposition of this bird, conjoined with its utility, has caused it to be regarded in all ages and countries with peculiar complacency. In ancient Egypt it held the next place to the sacred ibis; and in many parts of Africa and the East is still regarded with reverence.

In the month of March, or beginning of April, the stork arrives in small bands or flocks in Holland, where it universally meets with a kind and hospitable reception; returning year after year to the same town, and the same chimney-top, it reoccupies its deserted nest; and the gladness these birds manifest in again taking possession of their dwelling, "and the attachment which they testify towards their benevolent hosts, are familiar in the mouths of every one." Nor is the stork less remarkable for its affection towards its young; and the story is well known of a female, which, during the conflagration at Delft, chose rather to perish with her young than abandon them to their fate. Incubation and the rearing of the young being over by August, the stork, in the early part of that month, prepares for its departure. The north of Africa, and especially Egypt, are the places of its winter sojourning, for there the marshes are unfrozen, its food is in abundance, and the climate is congenial. Previous to setting out on their airy journey, multitudes assemble from the surrounding districts, chattering with their bills, as if in consultation. On the appointed night (a period which appears to be universally chosen by the migratory tribes), they mount into the higher regions of the air, and sail away southwards to their destined haven.

As they rise but heavily, they are very shy birds, and seldom let the fowler approach them. Their depredations are usually made in the darkest nights; at which time they enter a field of corn, and trample it down, as if it had been crossed over by a regiment of men. On other occasions, they choose some extensive, solitary marsh, where they range themselves all day, as if they were in deliberation; and not having that grain which is most to their appetites, wade the marshes for insects and other food, which they can procure with less danger.

In general it is a peaceful bird, both in its own society, and with respect to those of the forest. Though so large in appearance, a little falcon pursues and often disables it. The method is, with those who are fond of hawking, to fly several hawks together against it; which the crane endeavours to avoid, by flying up perpendicularly, till the air becomes too thin to support it any higher. The hawk, however, still bears it company; and though less fitted for floating in so thin a medium, yet, possessed of greater rapidity, it still gains the ascendancy. They both often rise out of sight; but soon the spectator, who keeps his eye fixed above, perceives them, like two specks, beginning to appear: they gather on his eye for a little space, and shortly after come tumbling perpendicularly together, with great animosity on the side of the hawk, and a loud screaming on that of the crane. Thus driven to extremity, and unable to fly, the poor animal throws itself upon its back, and, in that situation, makes a most desperate defence, till the sportsman coming up, generally puts an end to the contest with its life.

It was once the barbarous custom to breed up cranes to be thus baited; and young ones were taken from the nest to be trained up for this cruel diversion. It is an animal easily tamed; and, if we can believe Albertus Magnus, has a particular affection for man. This quality, however, was not sufficient to guard it from being made the victim of his fierce amusements. The female, which is easily distinguished from the male, by not being bald behind as he is, never lays above two eggs at a time; being like those of a goose, but of a bluish colour. The young ones are soon fit to fly, and then the parents forsake them to shift for themselves; but, before this time, they are led forth to the places where their food is most easily found. Though yet unfledged, they run with such swiftness that a man cannot easily overtake them. We are told that, as they grow old, their plumage becomes darker; and, as a proof of their longevity, Aldrovandus assures us that a friend of his kept one tame for above forty years.

Whatever may have been the disposition of the great, the vulgar of every country to this day bear the crane a compassionate regard. It is possible, the ancient prejudices in its favour, which once having been planted are eradicated but slowly, may still continue to operate. In some countries, it is considered as a heinous offence to kill a crane; and though the legislature declines to punish, yet the people do not fail to resent, the injury.* The crane, they, in some measure, consider as the prophet of the season: upon its approach or delay they regulate the periods of their rural economy. If their favourite bird comes early in the season, they expect a plentiful summer; if he is slow in his visits, they then prepare for an unfavourable spring. Whatever wisdom there may be in despising the prejudices of the vulgar, there is but little in condemning them. They have generally had their origin in good motives; and it should never be our endeavours to suppress any tender emotions of friendship or pity in those hard breasts that are, in general, unsusceptible of either.†

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* THE CRANE IN TURKEY.—From the Letters of Lady Mary Wortley Montague, we learn that they are so much under the protection of the authorities at Constantinople, that they nestle on the ground in the streets of that city. The Mahometans call the stork *Bel arje*; and it is nearly as sacred among them as the ibis was among the ancient Egyptians. In ancient Thessaly, the penalty of death was annexed to the murder of any one of these birds—so precious were they to that country for their destruction of the serpent race. Among the Moors they owe their security to a religious feeling; for that people believe that, at the prayer of Mahomet, God transformed into these birds a troop of Arabs who were robbing the pilgrims of Mecca.

† ADJUTANT BIRD.—Nothing tends more to diversify the scenery of India from that of

England, than the number of adjutants (large birds of the stork species, the *Ardea argala*), which are beheld in all parts of the presidency and military stations. They do not frequent the native part of Calcutta, nor the dwellings of the natives generally, so much as they do the residences of Europeans, as near the latter (being carnivorous) they find a greater supply of food than they possibly can do around the habitations of the former, whose diet is principally composed of vegetable productions and milk. They seem to entertain no fear of injury from the natives, as they will not flee at their approach, nor exhibit the least symptoms of alarm if surrounded by them; but if a European comes near, they immediately retreat to a greater distance, and will not suffer him to approach anything like so near as the natives do. This may in a great measure be owing to the many tricks which Europeans are accustomed to play on their voracity. Every morning several of these birds station themselves near to the cook-room doors, ready to seize the offal which may be thrown out by the cooks: and many furious battles take place in the course of the morning for the possession of bones, and other spoils which may occasionally present themselves to their watchful eyes. Their beaks are very long and thick, and they possess great strength in them. When they are fighting the chopping of their bills and fluttering of their wings are the signals to waiting kites and crows, numbers of which immediately surround them, and one of these active and vigilant spectators will commonly avail himself of the dispute of the quarrelling adjutants to carry off the prize for which they are contending. The crows are about the size of an English jackdaw, and very numerous in every part of Bengal. They are to be found by hundreds around all the houses of Europeans, and are ten times more active, vigilant, annoying, and crafty, than any birds we have in England. Nothing to which they can have access is safe from their marauding attacks. I lost many small articles from their pilfering disposition. I have seen them oftentimes fly into the room, and take off a slice or two of bread and butter, or anything else that might be left in the hall, after the dinner or tea party had just risen from table. Sometimes a number of crows will beset an adjutant, and torment him exceedingly. At length, the poor bird, quite wearied out by their impertinent attacks, suddenly makes a start, and catching hold of one of their number, swallows it instantly, when the other crows set up such a cawing as to disturb the whole neighbourhood. This I have witnessed more than once.

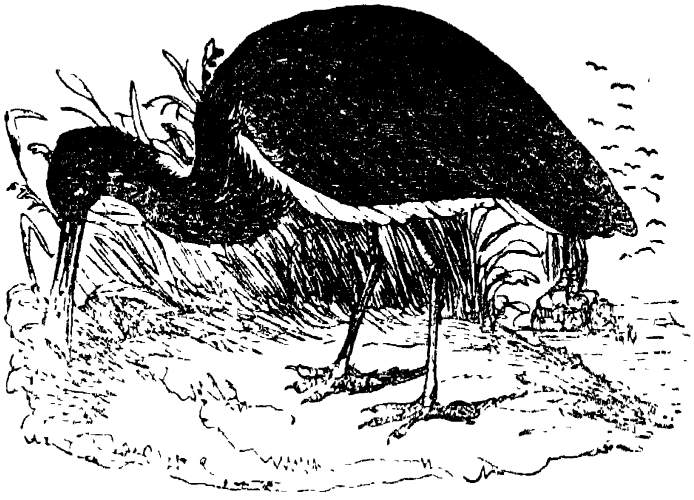
One of the tricks practised on the adjutants by Europeans is this:—a large bone is tied to half a brick or large stone, at the distance of about three feet, when the bone and its companion are thrown out to the birds, one of which seizes the bait, and greedily swallows it. The consequence is, that the stone hangs dangling from its beak, until the bird, unable to shake it off, rather than disgorge the bone, gives it a throw upwards, and swallows it also. It is said that in a few minutes the powerful chyle of the stomach destroys the string, when the stone or brick is cast out again.

Generally speaking, the adjutants are treated with much kindness, being viewed as great benefactors to man, in removing the impurities and offal which would otherwise soon taint the air, and breed disease. In fact, if one of these birds receives a hurt, it is carefully attended to, and, when recovered, permitted to go at large. By an ancient law of Bengal, a heavy penalty is attached to the killing of one of them. Two great reasons why they are more afraid of a European than of a native, are to be found in the native indolence of the Hindoo and the influence of his religion, which leads him to suppose that the spirits of his fathers dwell in the bodies of the animals, birds, insects, and reptiles around him, and that his own soul will, by and by, be transmigrated into the body of some such creature. Thus, my native boy refused to kill a poisonous reptile, when I desired him to do so, saying, "My father is dead, and my mother is dead also; and I do not know but it is one of them."

It was not long afterwards that a beautiful milk-white kitten, of the much admired Persian breed, which had been presented to me by Capt. Crouch, was seized as it lay basking in the veranda by one of these voracious birds, and instantly swallowed, to the great regret of the young folks, who were remarkably attached to it. Notwithstanding these predatory acts, we considered the adjutants as great benefactors in consuming the refuse of the yards, which, in that hot climate, would otherwise become an intolerable nuisance.—Statham.

CHAP. III.

THE STORK.



(The Stork.)

If we regard the **Stork** externally only, we shall be very apt to confound it with the crane. It is of the same size; it has the same formation as to the bill, neck, legs, and body, except that it is something more corpulent. Its differences are but very slight; such as the colour, which in the crane is ash and black, but in the stork is white and brown. The nails of the toes of the stork also are very peculiar; not being clawed like those of other birds, but flat like the nails of a man.

These, however, are but very slight differences; and its true distinctions are to be taken rather from its manners than its form. The crane has a loud, piercing voice; the stork is silent, and produces no other noise than the clacking of its under chap against the upper: the crane has a strange convolution of the windpipe through the breast-bone; the stork's is formed in the usual manner: the crane feeds mostly upon vegetables and grain; the stork preys entirely upon frogs, fishes, birds, and serpents: the crane avoids towns and populous places; the stork lives always in or near them; the crane lays but two eggs, and the stork generally four. These are distinctions fully sufficient to mark the species, notwithstanding the similitude of their form.

Storks are birds of passage, like the former; but it is hard to say whence they come or whither they go. When they withdraw from Europe, they all assemble on a particular day, and never leave one of their company behind them. They take their flight in the night; which is the reason the way they go has never been observed. They generally return into Europe in the middle of March, and make their nests on the tops of chimneys and houses as well as of high trees. The females lay from two to four eggs, of the size and colour of those of geese; and the male and female sit upon them by turns. They are a month in hatching; and when their young are excluded, they are particularly solicitous for their safety.

As the food of these birds consists in a great measure of frogs and serpents, it is not to be wondered at that different nations have paid them a particular veneration.* There is an opinion that it will only live in a republic; and that story of its filial piety, first falsely propagated of the crane, has in part been ascribed to the stork. But it is not in republics alone that the stork is seen to reside, as there are few towns on the Continent, in low, marshy situations, but have the stork as an inmate among them; as well the despotic princes of Germany, as the little republics of Italy.*

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* Storks.—These birds have in all ages been regarded with peculiar favour—in some countries amounting almost to veneration—partly on account of the services which they perform in the destruction of noxious animals and in removing impurities from the surface of the earth, and partly on account of the mildness of their temper, the harmlessness of their habits, and the moral virtues with which imagination has delighted to invest them. Among the ancient Egyptians, the stork was regarded with a reverence inferior only to that which, for similar causes, was paid to the sacred Ibis, considered, and with some show

The stork seems a general favourite even among the moderns; but with the ancient Egyptians their regard was carried even to adoration. This enlightened people, who worshipped the Deity in his creatures, paid divine honours to the ibis, as is universally known. It has been usually supposed that the ancient ibis is the same with that which goes at present by the same name:—a bird of the stork kind, of about the size of a curlew, all over black, with a bill very thick in the beginning, but ending in a point, for the better seizing its prey, which is caterpillars, locusts, and serpents. But, however useful the modern ibis may be in ridding Egypt, where it resides, of the vermin and venomous animals that infest it, yet it is much doubted whether this be the same ibis to which the ancients paid their adoration. Maillet, the French consul at Cairo, observes, that it is very hard to determine what bird the ancient ibis certainly was, because there are cranes, storks, hawks, kites, and falcons, that are all equal enemies to serpents, and devour a vast number. He further adds, that, in the month of May, when the winds begin to blow from the internal parts of Africa, there are several sorts of birds that come down from Upper Egypt, from whence they are driven by the rains, in search of a better habitation, and that it is then they do this country such signal services. Nor does the figure of this bird, hieroglyphically represented on their pillars, mark it sufficiently to make the distinction Besides, the modern ibis is not peculiar to Egypt, as it is to be seen but at certain seasons of the year, whereas we are informed by Pliny that this bird was seen no where else. It is thought, therefore, that the true ibis is a bird of the vulture kind, described above, and called by some the capon of Pharaoh, which not only is a devourer of serpents, but will follow the

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of reason, as one of the tutelary divinities of the land. The same feeling is prevalent in many parts of Africa and the East; and even in Switzerland and in Holland something like superstition seems to mingle, in the minds of the common people, with the hospitable kindness which a strong conviction of its utility disposes them to evince towards this favourite bird In the latter country, more particularly, the protection which is accorded to it is no more than it fairly deserves, as the unconscious instrument by which the dikes and marshes are relieved from a large portion of the enormous quantity of reptiles engendered by the humidity and fertility of the soil. On the other hand, the white stork appears to be influenced by the same friendly feeling towards man. Undismayed by his presence, it builds its nest upon the house-top, or on the summits of the loftiest trees in the immediate neighbourhood of the most frequented places It stalks perfectly at its ease along the busy streets of the most crowded town; and seeks its food on the banks of rivers, or in fens in close vicinity to his abode. In numerous parts of Holland, its nest, built on the chimney-top, remains undisturbed for many succeeding years, and the owners constantly return with unerring sagacity to the well-known spot. The joy which they manifest on again taking possession of their deserted dwellings, and the attachment which they testify towards their benevolent hosts, are familiar in the mouths of every one.—ZOOLOGICAL SOCIETY'S GARDENS.

* THE STORKS IN GERMANY.—In Lower Germany there is a singular belief concerning the storks (*abus*, as the Low Germans call them), which build on the ridges of the thatched houses in the flat and marshy parts of Germany. It is, that they pay the master of the house for leave to build their nests on his roof: the first year they pay a quill feather, some say cut into a pen; the second, an egg; and the third year, a young one; the fourth year they begin with the feather again, and so on as long as the same pair continue to build on the house. These payments they lay on the dunghill, which stands before what the Germans call the long door, like our barn door; the barn and dwelling-house are under the same roof, the door for the family is at the side.

This I was assured was the fact by several, but I could find none who had seen it, they only knew somebody who had a nest and had been paid. They think it a sign of good luck to have a nest, and, therefore, as soon as they see a pair of storks flying about, they collect straw, &c., for them to make their nest with.—MAGAZINE OF NATURAL HISTORY.

caravans that go to Mecca, to feed upon the offal of the animals that are killed on the journey.*

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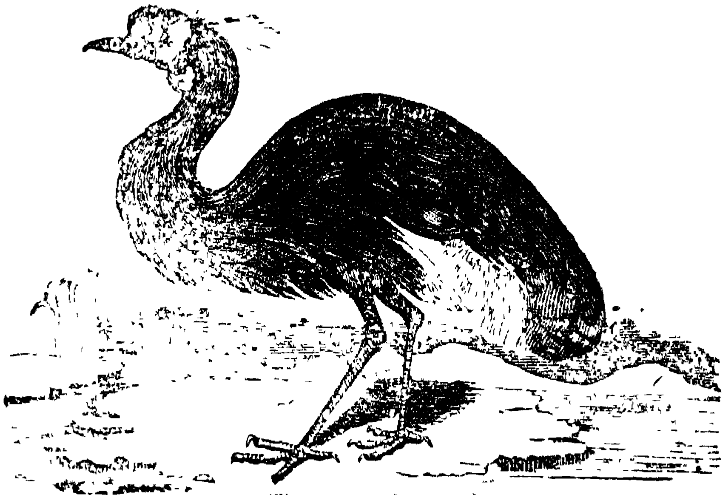
* The Sacred Ibis (*Ibis religiosa*).—It is but within the last few years that this bird, so celebrated among the ancients, and held in such reverence by the Egyptians, has become identified; naturalists having long mistaken others, entirely different, for that which was once so well known as the most sacred of all sacred animals. The ibis was a bird to which the ancient Egyptians rendered religious homage; it was reared with solicitude in their temples, "wandered unmolested through their towns, and its murderer, although he had involuntarily become so, was punished with death." The most exalted virtues were attributed to it, and after its death it was embalmed with all the honours and respect which children were accustomed to pay to a deceased parent; nay, it was the guardian of the sacred land, and the gods would have assumed its figure had they dwelt on earth—Mercury having indeed taken it upon himself when he came to instruct mankind. Many other stories, equally absurd, were told and credited by that astonishing people, who are a marked illustration of the pitch to which extensive attainments in the arts may be carried, while the greatest ignorance may prevail as to the knowledge of the true and living God.

Although well-preserved mummies of this bird are to be met with in abundance, they appear, if not to have escaped the observation of naturalists, at all events to have been examined without much penetration, and even Blumenbach, the celebrated physiologist of Germany, who examined the bones of the true ibis, in a mummy at London, considered them as belonging to the tantalus ibis, a bird as large as a stork, and with a similar kind of beak; thus falling into the universal error. The individual to whom the merit of breaking through this popular error is due, is the traveller Bruce, who used his own eyes, and exercised his own judgment. He at once recognised the true ibis as one which at the present day abounds on the banks of the Nile, and is known there by the name of Abou-Hannes, or Father John. This bird, he tells us, appeared to him the same "as that which the mummy-pitchers contained;" while the tantalus ibis of Linnæus, or white ibis of Buffon, was there unknown or extremely rare, so that he never even saw it. The various sculptured figures of the sacred ibis, which are still preserved upon the relics of antiquity, Egyptian, Greek, and Roman, are sufficient to confirm his opinion, independent of the actual relics of the bird in question. At a subsequent period, the illustrious Cuvier, suspecting the accuracy of the prevailing theories entertained by the scientific, instituted a series of investigations which led to a similar conclusion. Speaking of two ibis mummies, taken from the pits of Saccara, he says, "On carefully exposing them, we perceived that the bones of the embalmed bird were much smaller than those of the tantalus ibis of naturalists; that they did not much exceed those of the curlew in size; that its beak resembled that of the latter, being only a little shorter in proportion to its thickness, and not at all that of the tantalus; and, lastly, that its plumage was white, with the quills marked with black, as the ancients have described it We found, after some inquiries, that the mummies of the ibis, which had been opened before by different naturalists were similar to ours." Buffon, who examined several, and even noticed the character of the different parts, was blindly led away by the popular opinion. And yet the paintings of Egyptian ceremonies at Herculaneum, in which several of the ibis are drawn walking in the courts of temples; the mosaic of Palestine, which presents these birds perched upon buildings; various medals and bronze figures, all of which are accurate representations, were known; so that, as is too often the case in matters of the highest moment as well as in those relating to science or art, the eyes and the understanding seem to have been wilfully blinded. One cause of this universal error, however, arose from the supposition that a bird, described as a destroyer of serpents, and which, according to the information received by Herodotus, once saved Egypt from the invasion of a host of "winged serpents," must be a bird of considerable size and armed with a large and powerful beak, and which must therefore be sought for among such as possessed these characters; "for how could a bird with a weak bill, a curlew, devour these dangerous reptiles?" That the ibis religiosa ate nothing but serpents, is not pretended, but that it did eat them, is also proved; and it is well observed by Cuvier, "that positive proofs, such as descriptions, figures, and mummies, ought to preponderate always over accounts of habits, too often imagined, without any other motive than to justify the different worships rendered to animals. "It might," says he, "be added, the serpents from which the ibis delivered Egypt, are represented to us as very venomous, but not as very large. I have even obtained direct proof that the birds preserved as mummies, and which have had a beak precisely similar to that of our bird, were true serpent-eaters; for I found in one of their mummies the still undigested remains of the skin and scales of serpents, which I have deposited in our anatomical galleries." The identity of

CHAP. IV.

THE BALEARIC AND OTHER FOREIGN CRANES.



(The Crowned Crane.)

Having ended the last chapter with doubts concerning the ibis, we shall begin this with doubts concerning the **Balearic Crane**. Pliny has described a bird of the crane kind with a topping resembling that of the green woodpecker. This bird for a long time continued unknown till we became acquainted with the birds of tropical climates, when one of the crane kind, with a topping, was brought into Europe, and described by Aldrovandus as Pliny's Balearic Crane. Hence these birds, which have since been brought from Africa and the East in numbers, have received the name of Balearic Cranes, but without any just foundation. The real Balearic Crane of Pliny seems to be

the sacred ibis being thus established, it remains for us to give our readers some description of it.

This celebrated bird belongs to the tribe of waders, and to that division termed *scolopacida* (*longirosters*, Cuvier), distinguished by a long, slender bill, adapted for searching for worms and insects among the soft weed of sluggish rivers and marshes. This division contains several genera, of which one is that of ibis (Cuvier), to which the present species belongs. The characters consist in the beak being arched, somewhat stout at the base, where it is square; and the head and neck more or less denuded of feathers; with other particulars not immediately interesting. The sacred ibis (*ibis religiosa*, Cuvier), the Abou-Hannes of Bruce, is about the size of a common fowl In youth the neck is partially covered with down or small feathers of a blackish tint, which fall off when the plumage is mature; leaving the head and neck bare, which, with the beak and feet, are of a decided black colour. The general plumage is a clear and spotless white, with the exception of the tips of the quill feathers, which are glossy black, with violet reflection: as are also the last four secondaries, which have the barbs singularly elongated, and silky, so as to form a graceful plume hanging down over the wings and tail, and presenting an effective contrast to the purity of the rest of the plumage

A specimen of this interesting bird may be seen in the museum of the Zoological Society; and a mummy, in a fine state of preservation, partially freed from the linen bandages, in order that the principal parts may be displayed, is in the noble museum of the Royal College of Surgeons.

The **Black Stork** is, in one respect, diametrically opposed to that of the white.—Instead of domesticating itself, as it were, with man, it shuns his society, and makes its temporary dwelling in the most secluded spots, frequenting impenetrable morasses, or the banks of such rivers and lakes as are seldom disturbed by the presence of intruders, and building its nest on the summits of the loftiest pines. Its food is exactly similar to that of its more social fellow; and their manners, except in this peculiar sullenness on the part of the black stork, closely correspond. It submits itself with perfect resignation to captivity, never using its powerful bill as a weapon of offence against its companions. It appears to have no other voice than the clattering sound which it produces by the snapping of its mandibles.

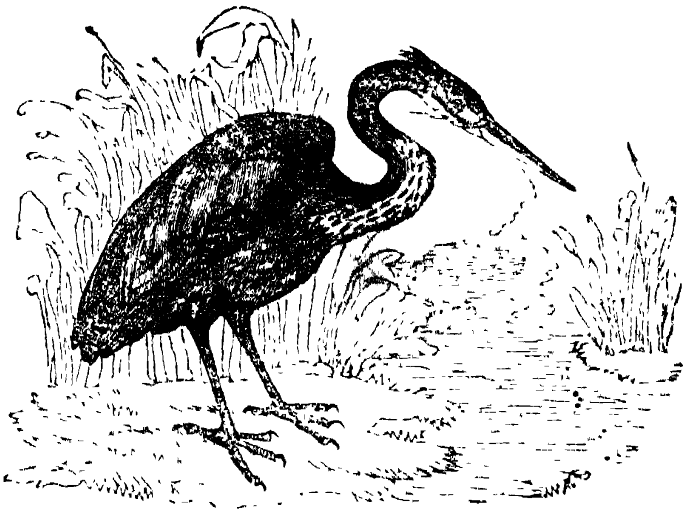
the lesser ash-coloured heron, with a topping of narrow white feathers. or perhaps the egret, with two long feathers that fall back from the sides of the head. The bird that we are about to describe, under the name of the Balearic Crane, was unknown to the ancients; and the heron or egret ought to be reinstated in their just title to that name.

When we see a very extraordinary animal, we are naturally led to suppose that there must be something, also, remarkable in its history to correspond with the singularity of its figure. But it often happens that history fails on those occasions where we most desire information. In the present instance, in particular, no bird presents to the eye a more whimsical figure than this, which we must be content to call the Balearic Crane. It is pretty nearly of the shape and size of the ordinary crane, with long legs and a long neck, like others of the kind; but the bill is shorter, and the colour of the feathers of a dark greenish grey. The head and throat form the most striking part of this bird's figure. On the head is seen standing up a thick, round crest, made of bristles, spreading every way, and resembling rays standing out in different directions. The longest of these rays are about three inches and a half; and they are all topped with a kind of black tassels, which give them a beautiful appearance. The sides of the head and cheeks are bare, whitish, and edged with red, while underneath the throat hangs a kind of bag or wattle, like that of a cock, but not divided into two. To give this odd composition a higher finishing, the eye is large and staring; the pupil, black and big, surrounded with a gold-coloured iris that completes the bird's very singular appearance.

From such a peculiar figure, we might be led to wish for a minute history of its manners; but of these we can give but slight information. This bird comes from the coast of Africa and the Cape de Verd Islands. As it runs, it stretches out its wings, and goes very swiftly, otherwise its usual motion is very slow. In their domestic state, they walk very deliberately among other poultry, and suffer themselves to be approached (at least it was so with that I saw) by every spectator. They never roost in houses; but about night, when they are disposed to go to rest, they search out some high wall, on which they perch in the manner of a peacock. Indeed, they so much resemble that bird in manners and disposition, that some have described them by the name of the sea-peacock; and Ray has been inclined to rank them in the same family. But, though their voice and roosting be similar, their food, which is entirely upon greens, vegetables, and barley, seems to make some difference.

CHAP. V.

THE HERON AND ITS VARIETIES.



(The Heron.)

Birds of the crane, the stork, and the heron kind, bear a very strong affinity to each other; and their differences are not easily discernible. As for the crane and the stork, they differ rather in their nature and internal conformation than in their external figure; but still, they may be known asunder, as well by their colour, as by the stork's claws, which are very peculiar, and more resembling a man's nails than the claws of a bird. The **Heron** may be distinguished from both, as well by its size, which is much less, as by its bill, which in proportion is much longer; but particularly by the middle claw on each foot, which is toothed like a saw, for the better seizing and holding its slippery prey.*

Of this tribe, Brisson has enumerated not less than forty-seven sorts, all differing in their size, figure, and plumage, and with talents adapted to their place of residence, or their peculiar pursuits. But, how various soever the heron kind may be in their colours or their bills, they all seem possessed of the same manners, and have but one character of cowardice and rapacity, indolence, yet insatiable hunger. Other birds are found to grow fat by an abundant supply of food; but these, though excessively destructive and voracious, are ever found to have lean and carrion bodies, as if not even plenty were sufficient for their support.

The common heron is remarkably light in proportion to its bulk, scarce weighing three pounds and a half, yet it expands a breadth of wing which is five feet from tip to tip. Its bill is very long, being five inches from the point to the base; its claws are long, sharp, and the middlemost toothed like a saw. Yet, thus armed as it appears for war, it is indolent and cowardly, and even flies at the approach of a sparrowhawk. It was once the amusement of the great to pursue this timorous creature with the falcon; and heron-hawking was so favourite a diversion among our ancestors, that laws were enacted for the preservation of the species; and the person who destroyed their eggs was liable to a penalty of twenty shillings for each offence.

At present, however, the defects of the ill-judged policy of our ancestors is felt by their posterity; for, as the amusement of hawking has given place to the more useful method of stocking fish-ponds, the heron is now become a most formidable enemy. Of all other birds, this commits the greatest devastation in fresh waters; and there is scarce a fish, though never so large, that he will not strike at and wound, though unable to carry it away. But the smaller fry are his chief subsistence; these, pursued by their larger fellows of the deep, are obliged to take refuge in shallow waters, where they find the heron a still more formidable enemy. His method is to wade as far as he can go into the water, and there patiently wait the approach of his prey, which, when it comes within sight, he darts upon it with inevitable aim. In this manner he is found to destroy more in a week than an otter in three months. So great are the digestive powers of this fresh-water tyrant, and so detrimental to those who stock ponds with fish.

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* **Distinction.**—Cranes are distinguished by having the head bald; Storks have the orbits round the eyes naked; and Herons have the middle claw serrated internally. Herons comprehend the species known under the names of Egrets, Bitterns, Crab-eaters.

In general, he is seen taking his gloomy stand by the lake side, as if meditating mischief, motionless, and gorged with plunder. His usual attitude on this occasion is to sink his long neck between his shoulders, and keep his head turned on one side, as if eyeing the pool more intently. When the call of hunger returns, the toil of an hour or two is generally sufficinet to fill his capacious stomach; and he retires long before night to his retreat in the woods. Early in the morning, however, he is seen assiduous at his usual occupation.

But, though in seasons of fine weather the heron can always find a plentiful supply, in cold or stormy seasons his prey is no longer within reach: the fish that before came into the shallow water now keep in the deep, as they find it to be the warmest situation. Frogs and lizards also seldom venture from their lurking places; and the heron is obliged to support himself upon his long habits of patience, and even to take up with the weeds that grow upon the water. At those times he contracts a consumptive disposition, which succeeding plenty is not able to remove; so that the meagre glutton spends his time between want and riot, and feels alternately the extremes of famine and excess. Hence, notwithstanding the care with which he takes his prey, and the amazing quantity he devours, the heron is always lean and emaciated; and though his crop be usually found full, yet his flesh is scarce sufficient to cover the bones.

The heron usually takes his prey by wading into the water, yet it must not be supposed that he does not also take it upon the wing. In fact, much of his fishing is performed in this manner; but he never hovers over deep waters, as there his prey is enabled to escape him by sinking to the bottom. In shallow places he darts with more certainty; for though the fish at sight of its enemy instantly descends, yet the heron, with his long bill and legs, instantly pins it to the bottom, and thus seizes it securely. In this manner, after having been seen with its long neck for above a minute under water, he rises upon the wing, with a trout or an eel struggling in his bill to get free. The greedy bird, however, flies to the shore, scarce gives it time to expire, but swallows it whole, and then returns to fishing as before.*

* Capture of the Heron.—Herons are taken various ways. Sometimes they are shot while fishing, or sweeping leisurely along the banks; but they are so shy that the sportsman can rarely get within gun-shot of them. Occasionally, a living fish is attached to a hook at the end of a line, and left to swim in the waters which they are known to frequent, and they are thus caught, as it were, by angling. When falconry was in fashion, hawking at the heron was regarded as the most noble of its branches; the powerful wings of the heron, unequalled by any bird of its size, enabling it to mount in the air to an almost incredible height, and thus to put the powers of the falcon to their proof. For this purpose it was customary to establish the herons in a proper situation, to which they were attached by precautions taken to provide them with necessaries. These heronries, as they were called, are now become exceedingly rare.

The heron, when taken young, readily becomes habituated to captivity, but the old birds usually refuse all sustenance, and perish of inanition. In former days, when it was necessary to procure such for the training of the hawks, it was usual, according to Sir J. Sebright, "to cram them with food, and to tie a piece of mat round their necks to prevent them from throwing it up again." Some times, however, the old birds have been known to become tame, and even domesticated; and the same authority to whom we have just referred, mentions an instance that occurred within his own knowledge, in which, after recourse had been had to the operation of cramming and tying down the food, the bird "became so tame as to follow its master on the wing to the distance of some miles, to come into the house when called, and to take food from the hand."—Ed.

Though this bird lives chiefly among pools and marshes, yet its nest is built on the tops of the highest trees, and sometimes on cliffs hanging over the sea. They are never in flocks when they fish, committing their depredations in solitude and silence; but in making their nests they love each other's society; and they are seen, like rooks, building in company with flocks of their kind. Their nests are made of sticks and lined with wool; and the female lays four large eggs of a pale green colour. The observable indolence of their nature, however, is not less seen in their nestling than in their habits of depredation. Nothing is more certain, and I have seen it a hundred times, than that they will not be at the trouble of building a nest when they can get one made by the rook, or deserted by the owl, already provided for them. This they usually enlarge and line within, driving off the original possessors should they happen to renew their fruitless claims.

The heron is said to be a very long lived bird; by Keysler's account it may exceed sixty years; and by a recent instance of one that was taken in Holland, by a hawk belonging to the Stadtholder, its longevity is again confirmed, the bird having a silver plate fastened to one leg, with an inscription, importing that it had been struck by the Elector of Cologne's hawks thirty-five years before.*

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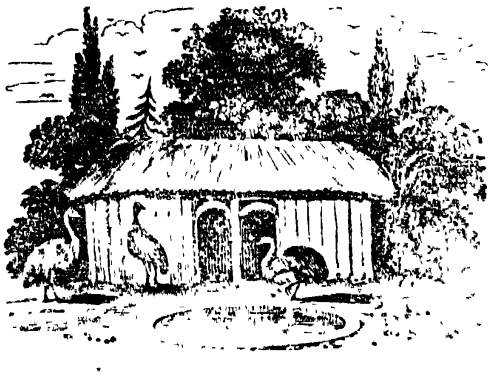
* HERONRIES.—The Heronries recorded to be existing at present in this country, are at Penshurst Place, Kent; at Halton, the seat of Mr. Bethel, near Beverly, in Yorkshire; at Picton, the seat of Lord Caernarvon; in Gobay Park, on the road to Penrith, near a rocky pass called Yew Crag, on the north side of the romantic lake of Ulswater; at Cressi Hall, six miles from Spalding, in Lincolnshire; at Downington, in Holland, in the same county; at Brockley Woods, near Bristol; at Brownsea Island, near Poole, in Dorsetshire; and at Windsor. There is one also in the parish of Craigie, near Kilmarnock, in Ayrshire, Scotland.

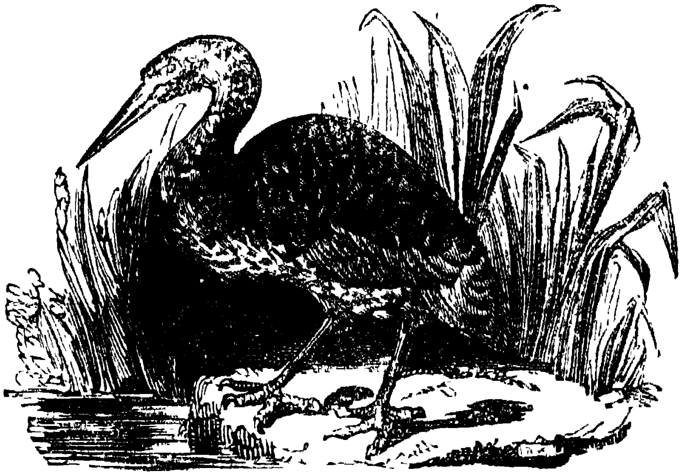
Belon mentions it as one of the extraordinary feats performed by the divine king, Francis I., that he formed two artificial heronries at Fontainebleau "the very elements themselves," he adds, "obeying the commands of this divine king (whom God absolve!!!); for to force nature is a work partaking of divinity." In order to enhance the merits of these French heronries, he undertakes to assert, that they were unknown to the ancients, because they are not mentioned in any of their writings; and for the same reason he concludes that there are none in Britain.

Before Belon's time, on the contrary, and before the "divine" constructor of heronries in France was born, there were express laws enacted in England for the protection of herons, it being a fine of ten shillings to take the young out of the nest; and six shillings and eightpence for a person without his own grounds killing a heron, except by hawking, or by the long-bow; while in subsequent enactments, the latter penalty was increased to twenty shillings, or three months' imprisonment. At present, however, in consequence of the discontinuance of hawking, little attention is paid to the protection of heronries, though, we believe, none of the old statutes respecting them have been repealed. Not to know a hawk from a *heronshaw* (the former name for a heron) was an old adage, which arose when the diversion of heron-hawking was in high fashion; it has since been corrupted into the absurd, vulgar proverb, "not to know a hawk from a hand-saw."—MONTAGUE'S ORNITHOLOGICAL DICTIONARY.



CHAP. VI.

THE BITTERN, OR MIRE-DRUM.*



(The Bittern, or Mire-drum.)

Those who have walked in an evening by the sedgy sides of unfrequented rivers must remember a variety of notes from different water-fowl:—the loud scream of the wild goose, the croaking of the mallard, the whining of the lapwing, and the tremulous neighing of the jack snipe. But of all those sounds, there is none so dismally hollow as the booming of the Bittern. It is impossible for words to give those who have not heard this evening call an adequate idea of its solemnity. It is like the interrupted bellowing of a bull, but hollower and louder, and is heard at a mile's distance, as if issuing from some formidable being that resided at the bottom of the waters.†

The bird, however, that produces this terrifying sound is not so big as a heron, with a weaker bill, and not above four inches long. It differs from the heron chiefly in its colour, which is in general of a palish yellow, spotted and barred with black. Its windpipe is fitted to produce the sound for which it is remarkable; the lower part of it dividing into the lungs is supplied with a thin, loose membrane, that can be filled with a large body of air, and exploded at pleasure. These bellowing explosions are chiefly heard from the beginning of spring to the end of autumn; and, however awful they may seem to us, are the calls to courtship, or of connubial felicity.

From the loudness and solemnity of the note, many have been led to suppose that the bird made use of external instruments to produce it, and that so small a body could never eject such a quantity of tone. The common people are of opinion, that it thrusts its bill into a reed that serves as a pipe for swelling the note above its natural pitch; while others, and in this number we find Thompson the poet, imagine that the bittern puts its head under water, and then violently blowing produces its boomings. The fact is, that the bird is sufficiently provided by nature for this call; and it is often heard where there are neither reeds nor waters to assist its sonorous invitations.‡

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* Bitterns are to be found in all countries where there are marshes. The *Little Bittern* is not much bigger than the throstle, and is rare in Great Britain. The *Yellow Bittern* is an inhabitant of Brazil, and is about two feet three inches in length.

† "At evening o'er the swampy plain
The bittern's boom comes far."—Southey.

‡ The Bittern's Boom.—The astounding voice of the Bittern appears to be a cry of appeal, which is frequently heard in the months of February and March, and is intended to make known to the female, who is habitually distant, the place in which the male is concealed. It is said that the females of this species are more numerous than the males: and that the former often come to the latter in considerable numbers. But such facts are very difficult to be accurately known respecting birds of so distrustful a character.

It hides in the sedges by day, and begins its call in the evening, booming six or eight times, and then discontinuing for ten or twenty minutes to renew the same sound. This is a call it never gives but when undisturbed and at liberty. When its retreats among the sedges are invaded, when it dreads or expects the approach of an enemy, it is then perfectly silent. This call it has never been heard to utter when taken or brought up in domestic captivity; it continues under the control of man a mute, forlorn bird, equally incapable of attachment or instruction. But, though its boomings are always performed in solitude, it has a scream which is generally heard upon the seizing its prey, and which is sometimes extorted by fear.

This bird, though of the heron kind, is yet neither so destructive nor so voracious. It is a retired, timorous animal, concealing itself in the midst of reeds and marshy places, and living upon frogs, insects, and vegetables; and though so nearly resembling the heron in figure, yet differing much in manners and appetites. As the heron builds on the tops of the highest trees, the bittern lays its nest in a sedgy margin, or amidst a tuft of rushes. The heron builds with sticks and wool; the bittern composes its simpler habitation of sedges, the leaves of water-plants, and dry rushes. The heron lays four eggs; the bittern generally seven or eight, of an ash-green colour. The heron feeds its young for many days; the bittern in three days leads its little ones to their food. In short, the heron is lean and cadaverous, subsisting chiefly upon animal food; the bittern is plump and fleshy, as it feeds upon vegetables when more nourishing food is wanting.

Whatever terror the boom of the bittern may inspire among the simple, its flesh is greatly in esteem among the luxurious. For this reason, it is as eagerly sought after by the fowler as it is shunned by the peasant; and as it is a heavy-rising, slow-winged bird, it does not often escape him. Indeed it seldom rises but when almost trod upon; and seems to seek protection rather from concealment than flight. At the latter end of autumn, however, in the evening, its wonted indolence appears to forsake it. It is then seen rising in a spiral ascent till it is quite lost from the view, making at the same time a singular noise very different from its former boomings. Thus the same animal is often seen to assume different desires; and while the Latins have given the bittern the name of the star-reaching bird (or the *stellaris*) the Greeks, taking its character from its more constant habits, have given it the title of the *οκνος*, or the lazy.*

The cry, however, above mentioned cannot be merely the expression of amorous desire, for it is heard at the period of the harvest, and, consequently, long after that of reproduction. The poet Thomson, as mentioned above, had a very erroneous notion of the manner in which the bird produces the noise, when he says—

> "So that scarce
> The bittern knows his tune with bill engulpht
> To shake the sounding marsh."

The bittern, on the contrary, (says Montagu), usually booms while flying high in the air.

As we are correcting the errors of poetry, we may as well notice that line of Southey—

> "Swift as the bittern soars on spiral wings."

which is not very ornithological; inasmuch, as neither the bittern, nor any other bird, has spiral wings. We are informed, however, that it sometimes soars to a prodigious height in the air, with a spiral ascent, making at the same time a singular noise.

The Bittern has become more scarce than formerly, since its flesh has been accounted a great delicacy. poulterers value it at half-a-guinea. Its principal food is small fish, frogs, insects; the warty lizard also becomes its prey, as has been found on dissection.

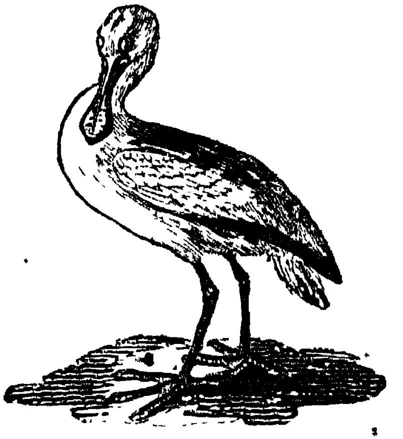
Ed.

* The Great American Bittern.—I was much interested with an account I heard the other day of a bird, a species of heron, I believe, called by Wilson in his *Ornithology*, the Great American Bittern; but, what is very extraordinary, he omits to mention a most interesting and remarkable circumstance attending it—which is that it has the power of emitting a light from its breast equal to the light of a common torch, which illuminates the water so as to enable it to discover its prey. As this circumstance is not mentioned by any of the naturalists that I have ever read, I had difficulty in believing the fact, and took some trouble to ascertain the *truth*, which has been confirmed to me by several gentlemen of undoubted veracity, and especially by Mr. Franklin Peale the proprietor of the Philadelphia Museum.

Arcana of Science, 1830.

CHAP. VII.

THE SPOONBILL, OR SHOVELER.



(The Spoonbill.)

As we proceed in our description of the crane kind, birds of peculiar forms offer, not entirely like the crane, and yet not so far different as to rank more properly with any other class. Where the long neck and stilt-like legs of the crane are found, they make too striking a resemblance, not to admit such birds of the number; and though the bill, or even the toes, should entirely differ, yet the outlines of the figure, and the natural habits and dispositions being the same, these are sufficient to mark their place in the general group of nature.

The **Spoonbill** is one of those birds which differs a good deal from the crane, yet approaches this class more than any other. The body is more bulky for its height, and the bill is very differently formed from that of any other bird whatever. Yet still it is a comparatively tall bird; it feeds among waters; its toes are divided; and it seems to possess the natural dispositions of the crane. The European spoonbill is of about the bulk of a crane; but as the one is above four feet high, the other is not more than three feet three inches.* The common colour of those of Europe is a dirty white; but those of America are of a beautiful rose-colour, or a delightful crimson. Beauty of plumage seems to be the prerogative of all the birds of that continent; and we here see the most splendid tints bestowed on a bird, whose figure is sufficient to destroy the effects of its colouring; for its bill is so oddly fashioned, and its eyes so stupidly staring, that its fine feathers only tend to add splendour to deformity. The bill, which in this bird is so very particular, is about seven inches long, and running out broad at the end, as its name justly serves to denote: it is there about an inch and a half wide. This strangely-fashioned instrument in some is black; in others of a light grey; and in those of America, it is of a red colour, like the rest of the body. All round the upper chap there runs a kind of rim, with which it covers that beneath; and as for the rest, its cheeks, and its throat, are without feathers, and covered with a black skin.†

A bird so oddly fashioned might be expected to possess some very peculiar appetites; but the spoonbill seems to lead a life entirely resembling all those of the crane kind; and Nature, when she made the bill of this bird so very broad, seems rather to have sported with its form, than to aim at any final cause for which to adapt it.

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* **Native Of.**—The Spoonbills are voyaging birds, not very wild, and show no aversion to living in a state of captivity. They are found in almost all countries of the old world. In Europe they are but seldom seen in the interior parts, and are only passagers on some lakes or the banks of rivers. They frequent the marshy coasts of Holland, of Brittany, and of Picardy: they are also seen in Prussia, in Silesia, and in Poland; and in summer they advance as far as West Bothia and Lapland. They are again to be found on the coasts of Africa, in Egypt, and the Cape of Good Hope, where they are called *Slangen-wreeter*—that is, serpent-eaters. Commerson has seen them at Madagascar. The negroes in some districts call them *Vang-van*, and in others, *Vourou Doulou*, or birds of the devil.

† **In England.**—The Spoonbill is rarely met with in England. Mr. Pennant mentions that a flock of these birds migrated into the marshes near Yarmouth, in Norfolk, in April, 1774. We have also been assured, that it is sometimes seen on the coast of Devonshire in the winter. It is said to build its nest in high trees, near to the sea.

The Shoveler chiefly feeds upon frogs, toads, and serpents—of which, particularly at the Cape of Good Hope, they destroy great numbers. The inhabitants of that country hold them in as much esteem as the ancient Egyptians did their bird ibis. The shoveler runs tamely about their houses; and they are content with its society as an useful though a homely companion. They are never killed, and indeed they are good for nothing when they are dead, for the flesh is unfit to be eaten.

This bird breeds in Europe, in company with the heron, in high trees, and in a nest formed of the same materials. Willughby tells us, that in a certain grove, at a village called Seven Huys, near Leyden, they build and breed yearly in great numbers. In this grove also, the heron, the bittern, the cormorant, and the shag, have taken up their residence, and annually bring forth their young together.

The shoveler lays from three to five eggs—white, and powdered with a few sanguine, or pale spots. We sometimes see, in the cabinets of the curious, the bills of American shovelers, twice as big and as long as those of the common kind among us; but these birds have not yet made their way into Europe.*

CHAP. VIII.

THE FLAMINGO.†

The Flamingo has the justest right to be placed among cranes; and though it happens to be web-footed, like birds of the goose kind, yet its height, figure, and appetites, entirely remove it from that grovelling class of animals. With a longer neck and legs than any other of the crane kind, it seeks its food by

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* Haunts—Economy.—The Spoonbills usually frequent woody marshes, near the mouths of rivers, building in preference upon the taller trees; but where these are wanting, taking up their abode among the bushes, or even among the reeds. The females usually lay three or four whitish eggs. They associate together, but not in any considerable number, and feed upon the smaller fishes and their spawn, shell-fish, reptiles, and other aquatic and amphibious animals. The form and flexibility of their bills are well adapted for burrowing in the mud after their prey; and the tubercles which are placed on the inside of their mandibles serve both to retain the more slippery animals, and to break down their shelly coverings. Their internal conformation, which is in nearly every respect similar to that of the stork, is admirably suited to this kind of food. They have no proper voice, the lower larynx being destitute of the muscles by which sounds are produced; and their only means of vocal expression consists in the snapping of their mandibles, which they clatter with much precipitation when under the influence of anger or alarm. In captivity they are perfectly tame, living in peace and concord with the other inhabitants of the farm-yard, and rarely exhibiting any symptoms of wildness, or desire of change. They feed on all kinds of garbage.

† The Flamingo—(*Phœnicopterus ruber*, L.)—The wading birds, or that group recognised under the general term *grallatores*, not only possess points of peculiar importance to the scientific ornithologist, but are, in many respects, no less interesting to the general lover of nature. The place which this great group occupies in nature is well worthy out consideration, as we obtain from the study a glimpse of that plan which appears to prevail throughout animated nature—a plan which goes to supply the space intervening between any two prominent points, with intervening links, so as to fill up the chasm which would otherwise be apparent. The

wading among waters; and only differs from all of this tribe in the manner of seizing its prey; for as the heron makes use of its claws, the flamingo uses only

station, then, of the wading birds, is intermediate between the rasorial or true ground birds on the one hand, and the natatorial or swimming birds on the other; partaking of the characters of each, they exhibit affinities in structure the more decided, as they approximate the more to one party or the other in their habits and manners. Thus, for example, that singular bird, the trumpeter, of South America, (*psophia crepitans*,) on the side of the waders, forms a close link of union with the cassowary or the ostrich, on the side of the erasorial order; and again on the part of the waders, we may discover an approximation in the oyster-catcher, *hæmatopus ostralegus*,) the avocet, (*avocetta*, Brigs.) the phalarope (*phalaropus*, Temm,) and many others, to the true water-birds, and especially that division which includes the semi-palmated geese, of which the Cereopsis is an example.

The structure and general conformation of the great family of wading birds is such as fits them for the local situation to which they are appointed, and the nature of their food. The woods and hills, and verdant plains, are not their portion; neither is the sea, nor the larger rivers and lakes, on the surface of which, far away from the shore, so many revel in a congenial element; but theirs are the swamp and the morass, and the low and oozy lands which border the sea, and its petty creeks and inlets. Here they find their food, which consists of the smaller fishes, reptiles, snails, insects, and water-plants. Their legs are accordingly of great length, the thighs often bare of feathers for a considerable distance, and the toes either long and spreading, or partially webbed; many, if necessity requires, can swim, and some few swim and dive with great dexterity. In proportion to the length of their legs is that of the neck, or at least generally so, and where the neck does not bear a due relative proportion, its length is generally made up by that of the beak; but in many, as the stork or the heron, we find both the neck and the beak equally elongated. To the heron, in particular, which lives on fish, and which it catches by darting its beak at them with the rapidity of an arrow, the utility of such a provision must be very apparent. In the structure of the beak, the wading birds offer much variety, according to the particular nature of the food to be obtained. In many it is long, powerful, and pointed; in others, broad and rounded; and again in others, soft and pulpy at the tip, and supplied with nerves, so as to perform the office of a feeler, when inserted into the oozy mud in search of minute insects or seeds. Thus the heron, the spoonbill, the oyster-catcher, and the woodcock, afford examples by way of contrast, in each of which we find this organ so modified as to be consonant to the nature and habits of its possessor.

These passing remarks will suffice to introduce a bird, no less singular in its form than in its manners, to the notice of our readers. We allude to the flamingo, (*phœnicopterus ruber*, Linn.) The remarkable figure and proportions of this bird at once indicate that it belongs to the present order; and, in fact, few birds are a better illustration of it. The neck is slender, and of great length. In the specimen before us it measures two feet, and the legs the same, the body being less than that of a common goose, slender and tapering: thus it is enabled to wade through shallows and morasses with great security. But as the flamingo frequents the coast of the sea, and the adjacent marshes, the power of swimming is granted to it as an additional provision, and its toes are partially webbed; thus it may fearlessly venture even beyond its depth, nor fear being carried away by the retiring tide. Its food consists of small fish, shells, and water-insects; for the capture of which its beak is most singularly constructed: in length it is nearly five inches; the upper mandible is bent downwards in the middle, at an acute angle, as if broken, the space from the angle to the point being a broad, flat plate, of a somewhat oval figure; the lower mandible, which is the largest, is so adjusted as to fit the angle with its edges, its under surface being gently arched downwards. The edges of both mandibles are furnished with a row of serrations or tooth-like eminences, those of the upper being the largest. The use of these is like a strainer, for allowing the water to pass through, but retaining any small body, as an insect or a fish, for farther investigation. In searching for food among the mud at the bottom of waters, the upper and not the under mandible is applied to the ground; the flat portion of its surface being well adapted for pressing close down upon the soft bed of the marsh or creek; hence in that situation the inferior mandible is placed uppermost, and by its motion works the disturbed and turbid water through the two, as we see in ducks and other aquatic birds. The tongue is large and fleshy, and the sense of taste probably acute.

The Greeks called this bird *Phœnicopterus*, which means wings of flame—an epithet especially suitable to individuals of two years old, whose wings alone are of a fine carnation, while the neck and body are still invested with white plumes.

its bill, which is strong and thick for the purpose, the claws being useless, as they are feeble, and webbed like those of water-fowl.

The Flamingo is the most remarkable of all the crane kind, the tallest, bulkiest, and the most beautiful. The body, which is of a beautiful scarlet, is no bigger than that of a swan; but its legs and neck are of such an extraordinary length, that when it stands erect it is six feet six inches high. Its wings, extended, are five feet six inches from tip to tip; and it is four feet eight inches from tip to tail. The head is round and small, with a large bill, seven inches long, partly red, partly black, and crooked like a bow. The legs and thighs, which are not much thicker than a man's finger, are about two feet eight inches high; and its neck near three feet long. The feet are not furnished with sharp claws, as in others of the crane kind; but feeble, and united by membranes, as in those of the goose. Of what use these membranes are does not appear, as the bird is never seen swimming, its legs and thighs being sufficient for bearing it into those depths where it seeks for prey.

This extraordinary bird is now chiefly found in America, but was once known on all the coast of Europe.* Its beauty, its size, and the peculiar delicacy of its flesh, have been such temptations to destroy or take it, that it has long since deserted the shores frequented by man, and taken refuge in countries that are as yet but thinly peopled. In those desert regions, the flamingos live in a state of society, and under a better polity than any other of the feathered creation.

When the Europeans first came to America, and coasted down along the African shores, they found the flamingos on several shores on either continent, gentle, and no way distrustful of mankind (g). They had long been used to security, in the extensive solitudes they had chosen; and knew no enemies but those they could very well evade or oppose. The Negroes and the native Americans were possessed but of few destructive arts for killing them at a distance; and when the bird perceived the arrow, it well knew how to avoid it. But it was otherwise when the Europeans first came among them: the sailors, not considering that the dread of fire-arms was totally unknown in that part of the world, gave the flamingo the character of a foolish bird, that suffered itself to be approached and shot at. When the fowler had killed one, the rest of the flock, far from attempting to fly, only regarded the fall of their companion in a kind of fixed astonishment: another and another shot was discharged: and thus the fowler often levelled the whole flock, before one of them began to think of escaping.

But at present it is very different in that part of the world; and the flamingo is not only one of the scarcest, but of the shyest birds in the world, and the most difficult of approach. They chiefly keep near the most deserted and inhospitable shores; near salt-water lakes and swampy islands. They come down to the banks of rivers by day; and often retire to the inland, mountainous parts of the country at the approach of night. When seen by mariners in the day, they always appear drawn up in a long close line of two or three hundred together; and, as Dampier tells us, present, at the distance of half a mile, the exact representation of a long brick wall. Their rank, however, is broken when they seek for food; but they always appoint one of the number as a watch, whose only employment is to observe and give notice of danger, while the rest are feeding. As soon as this trusty sentinel perceives the remotest appearance of danger, he gives a loud scream, with a voice as shrill as a trumpet, and instantly the whole cohort are upon the wing. They feed in silence; but, upon this occasion, all the flock are in one chorus, and fill the air with intolerable screamings.

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* INHABITANT OF.—The Flamingo appears extended over the entire globe, from below forty up to forty-six degrees of latitude. This bird, which never visits the regions of the north, is migratory in the warm and temperate climates of both continents. It is merely a bird of passage on the southern coasts of Europe, and only to be met accidentally on the rivers in the interior. These flamingos live on shell-mollusca, on the spawn of fish, and on insects. Always in flocks, they form in file for the purpose of fishing, and even preserve this figure, when they repose upon the strand. They are accustomed to establish sentinels for the common safety; and whether they repose or fish, one of them always stands as a videt, with his head erect. If any thing alarms him, he sends forth a cry like the sound of a trumpet. The flock immediately sets off, and observes in its flight a similar order to that of the cranes. Some travellers, however, assert that the flamingos are stupified by a surprise—that they leave the hunter an opportunity of laying them all prostrate.

(g) Albin's New History of Birds.

These birds always go in flocks together; and they move in rank, in the manner of cranes. They are sometimes seen, at the break of day, flying down in great numbers from the mountains; and conducting each other with a trumpet cry, that sounds like the word Tococo, from whence the savages of Canada have given them the name. In their flight they appear to great advantage; for they then seem of as bright a red as a burning coal. When they dispose themselves to feed, their cry ceases; and then they disperse over a whole marsh, in silence and assiduity. Their manner of feeding is very singular: the bird thrusts down its head, so that the upper convex side of the bill shall only touch the ground; and in this position the animal appears, as it were, standing upon its head. In this manner it paddles and moves the bill about, and seizes whatever fish or insect happens to offer. For this purpose the upper chap is notched at the edges, so as to hold its prey with the greater security.

Their time of breeding is according to the climate in which they reside: in North America they breed in our summer; on the other side the line they take the most favourable season of the year. They build their nests in extensive marshes, and where they are in no danger of suprise. The nest is not less curious than the animal that builds it: it is raised from the surface of the pool about a foot and a half, formed of mud, scraped up together, and hardened by the sun or the heat of the bird's body: it resembles a truncated cone, or one of the pots which we see placed on chimneys; on the top it is hollowed out to the shape of the bird, and in that cavity the female lays her eggs, without any lining but the well-cemented mud that forms the sides of the building. She always lays two eggs and no more; and, as her legs are immoderately long, she straddles on the nest, while her legs hang down, one on each side, into the water.

The young ones are a long while before they are able to fly; but they run with amazing swiftness. They are sometimes caught, and, very differen from the old ones, suffer themselves to be carried home, and are tamed very easily. In five or six days they become familiar, eat out of the hand, and drink a surprising quantity of sea-water. But though they are easily rendered domestic, they are not reared without the greatest difficulty; for they generally pine away for want of their natural supplies, and die in a short time.*

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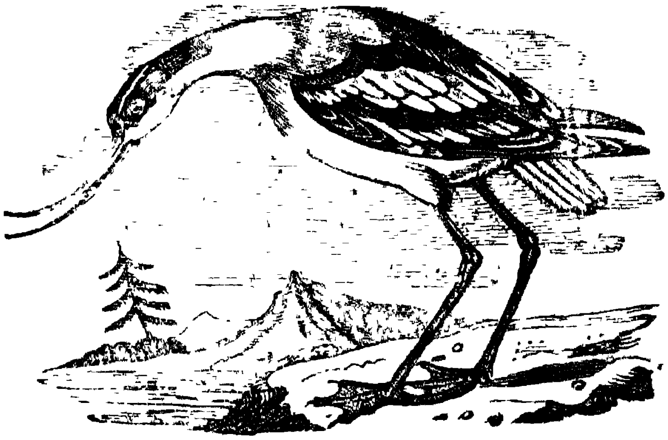
* Domestication.—Attempts have been made to domesticate the flamingo, but in our climate it languishes and soon dies. Peiresa, who had one in his possession, remarked that it steeped in water the bread which was presented to it; that it ate more frequently during night than day; and that, very sensible to the cold, it would approach the fire so nearly as to burn its feet. When it slept, it drew one leg under the belly; and when deprived of the use of one limb, it walked with the other, and used its bill like a crutch.

The down of the flamingo is opportuned to the same uses as that of the swan. The Indians make bonnets, &c., of the feathers. The Sardinians fabricate a flute with the bone of the leg, the tone of which is said to be very fine.

CHAP. IX.

THE AVOSETTA,* OR SCOOPER.



(The Avosetta, or Scooper.)

The extraordinary shape of the Avosetta's bill might incline us to wish for its history; and yet in that we are not able to indulge the reader. Natural historians have hitherto, like ambitious monarchs, shown a greater fondness for extending their dominions than cultivating what they possess. While they have been labouring to add new varieties to their catalogues, they have neglected to study the history of animals already known.

The Avosetta is chiefly found in Italy, and now and then comes over into England. It is about the size of a pigeon, is a pretty upright bird, and has extremely long legs for its size. But the most extraordinary part of its figure, and that by which it may be distinguished from all others of the feathered tribe, is the bill, which turns up like a hook, in an opposite direction to that of the hawk or the parrot. This extraordinary bill is black, flat, sharp and flexible at the end, and about three inches and a half long. From its being bare a long way above the knee, it appears, that it lives and wades in the waters. It has a chirping, pert note, as we are told; but with its other habits we are entirely unacquainted. I have placed it, from its slender figure, among the cranes; although it is web-footed, like the duck. It is one of those birds of whose history we are yet in expectation.

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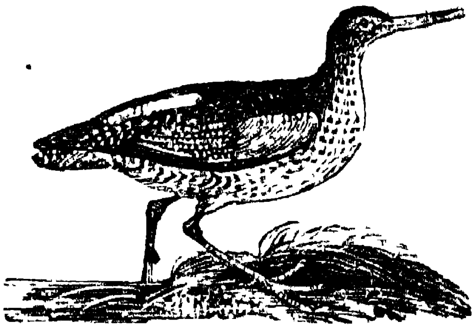
* The Avosetta.—The birds of this class of America and Europe prefer cold and temperate climates to hot countries. Their migrations are determined by the want or abundance of food. In winter they assemble in small flocks of six or seven, and frequent our shores, especially the mouths of large, muddy rivers, in search of worms and marine insects. These they scoop out of the mud with their recurved bills, which are admirably adapted for that purpose, being tough and flexible, like whalebone. The feet seem calculated for swimming; but they are never observed to take the water. It is therefore probable that they are furnished with a web merely to prevent their sinking into the mud. The female lays two eggs, about the size of those of a pigeon, of a white colour tinged with green, and marked with large black spots. It is said to be very tenacious of its young, and when disturbed at this season, will fly round in repeated circles, uttering a note that resembles the word *twit-twit.*

CHAP. X.

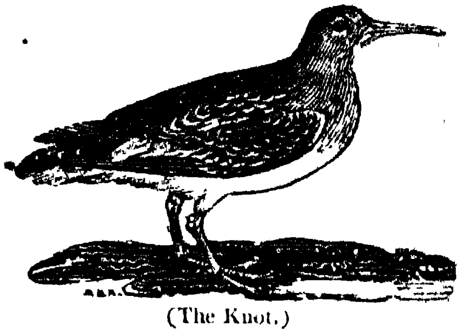
SMALL BIRDS OF THE CRANE KIND, WITH THE THIGHS PARTLY BARE OF FEATHERS.*

As I have taken my distinctions rather from the general form and manners of birds, than from their minuter, though perhaps more precise discriminations, it will not be expected that I should here enter into a particular history of a numerous tribe of birds, whose manners and forms are so very much alike. Of many of them we have scarce any account in our historians, but tedious descriptions of their dimensions, and the colour of their plumage; and of the rest, the history of one is so much that of all, that it is but the same account repeated to a most disgusting reiteration. I will, therefore, group them into one general draught; in which the more eminent, or the most whimsical, will naturally stand forward on the canvass.

In this group we find an extensive tribe of native birds, with their varieties and affinities; and we might add a hundred others, of distant climates, of which we know little more than the colour and the name. In this list is exhibited the Curlew, a bird of about the size of a duck, with a bill four inches long; the Woodcock, about the size of a pigeon, with a bill three inches long; the Godwit, of the same size, the bill four inches; the Green Shank, longer legged, the bill two inches and a half; the Red Shank, differing in the colour of its feet from the former; the Snipe, less by half, with a bill three inches. Then, with shorter bills—the Ruff, with a collar of feathers round the neck of the male; the Knot, the Sandpiper, the Sanderling, the Dunlin, the Purre, and the Stint. To conclude: with bills very short—the Lapwing, the Green Plover, the Grey Plover, the Dottrel, the Turnstone, and the Sea-lark. These, with their affinities, are properly natives or visitants of this country, and are dispersed along our shores, rivers, and watery grounds. Taking in the birds of this kind belonging to other coun-



(The Red Shank.)



(The Knot.)

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* Birds of this Class.—Of the birds of this class, we shall here enumerate a few, with their economy, habits, &c.—Ed.

The Curlew.—There are two species of the Curlew, to be found in Europe—the Common and Little Curlews. These birds fly in considerable flocks, and are well known upon the sea coasts in most parts—where, and in the marshes, they frequent in winter. They feed on worms, frogs, and all kinds of marine insects. In April, or the beginning of May, they retire into mountainous and unfrequented parts on the sea shore, where they breed; and do not return again until the approach of winter. There have been some advocates in favour of the flesh of this bird, but in general it is strong and fishy. The female of this bird is somewhat larger than the male, and is commonly called the jack-curley.

The Curlew, in his natural state, is so remarkably shy, that he is with difficulty approached; but, like other birds wholly dependent for their daily subsistence, soon becomes docile.

tries, the list would be very widely extended; and the whole of this class, as described by Brisson, would amount to near a hundred.

All these birds possess many marks in common; though some have peculiarities that deserve regard. All these birds are bare of feathers above the knee, or above the heel, as some naturalists choose to express it. In fact, that part which I call the knee, if compared with the legs of mankind, is analogous to the heel; but, as it is commonly conceived otherwise, I have conformed to the general apprehension. I say, therefore, that all these birds are bare of feathers above the knee; and in some they are wanting half way up the thigh. The nudity in that part, is partly natural, and partly produced by all birds of this kind habitually wading in water. The older the birds the barer are its thighs; yet even the young ones have not the same downy covering reaching so low as the birds of any other class. Such a covering there would rather be prejudicial, as being continually liable to get wet in the water.

As these birds are usually employed rather in running than in flying, and as their food lies entirely upon the ground, and not on trees, or in the air, so they run with great swiftness for their size, and the length of their legs assist their velocity. But as, in seeking their food, they are often obliged to change their station; so also are they equally swift of wing, and traverse immense tracts of country without much fatigue.

Most of the birds formerly described, have stated seasons for feeding and rest: the eagle kind prowl by day, and at evening repose; the owl by night, and keeps unseen in the day-time. But these birds, of the crane kind, seem at all hours employed: they are seldom at rest by day; and, during the whole night season, every meadow and marsh resounds with their different calls, to courtship or to food. This seems to be the time when they least fear interruption from man; and though they fly at all times, yet, at this season, they appear more assiduously employed, both in providing for their present support, and continuing that of posterity. This is usually the season when the insiduous fowler steals in upon their occupations and fills the whole meadow with terror and destruction.

As all of this kind live entirely in waters, and among watery places, they seem provided by nature with a warmth of constitution to fit them for that cold element. They reside, by choice, in the coldest climates; and as other birds migrate here in our summer, their migrations rather are mostly in the winter. Even those that reside among us the whole season, retire in summer to the tops of our bleakest mountains; where they breed, and bring down their young when the cold weather sets in.

Most of them, however, migrate, and retire to the polar regions; as those that remain behind in the mountains, and keep with us during summer bear no proportion to the quantity which in winter haunt our marshes and low grounds.*

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* Migration of the Woodcock.—We have a very correct account of the migration of the woodcock in the following extract:—

"Before I quit the Lands-end, it may be amusing to mention a particular of its natural history, which I think throws some light on the much disputed subject of the *migration* of English birds. You are aware, perhaps, that a controversy has long subsisted between ornithologists, whether those birds, which are seen amongst us at particular seasons remain in the kingdom concealed in indiscoverable recesses during the period of their disappearance, or whether they are actually absent from our climate at this time, and resident in countries more congenial to their nature and instincts. In this list of migratory birds, as they are called, the woodcock, that important article of luxury and sport, is enumerated. Mr Daines Barington, amongst others, is a strenuous opponent to the doctrine of this species of bird making a periodical passage from England to other countries; contending that it builds its nest, and breeds amongst us, in the same manner as other indigenous British birds; and is invisible in the summer only from the caution of its habits, and privacy of its retreats, in season. He further makes the assertion with respect to migratory birds in general, that there is no well attested instance of such migration actually taking place, which he considers as a convincing negative proof of the falsehood of that opinion. What the value of these examples of migration may be, which are adduced by Willughby, Buffon, Adanson, &c. I know not, as I have never paid any attention to the controversy; but I will venture to assert, that

The snipe sometimes builds here; and the nest of the curlew is sometimes found in the plashes of our hills: but the number of these is very small; and it is most probable that they are only some stragglers, who, not having strength or courage sufficient for the general voyage, take up from necessity their habitation here.*

had Mr. Daines Barrington made the question, with respect to woodcocks, a subject of his inquiry when he was in Cornwall, he would have learned a fact when he was in Lands-end, which must have at once settled scepticism on that head. He would here have been told by every peasant and fisherman, that the annual periodical arrival of the woodcocks from the Atlantic, at the close of the year, is as naturally expected, and as surely takes place, as the return of autumn and winter; and that the time of their visits is directed by so certain an instinct, that the inhabitants can tell by the temperature of the air, the week, if not the day on which they will arrive. We were told at Truro, as a proof of the definitive time of their arrival, that a gentleman there had sent to the Lands-end for several brace, to be forwarded to him for a particular occasion. His correspondent acquainted him in answer, that no woodcocks had yet arrived; but that on the third day from his writing, if the weather continued as it then was, there would be plenty. The state of the atmosphere remained unchanged, the visiters came as it was asserted they would, and the gentleman received the number of birds he had ordered."

WARNERS' TOUR THROUGH CORNWALL.

(The Snipe.)

* **SNIPES.**—The snipes though agreeing very much in external resemblance with the woodcocks, differ from them in natural habits. They do not inhabit woods, but remain in the mashy parts of meadows, in the herbage, and amongst the osiers which are on the banks of rivers. They are still more generally spread than the woodcocks, and there are no portions of the globe in which some of them have not been found. Autumn is the season for the arrival of the common snipe, in most of the southern and western countries of Europe. It then extends through meadows, marshes, bogs, and along the banks of streams and rivers. When it walks, it carries the head erect, without either hopping or fluttering, and gives it a horizontal movement, while the tail moves up and down. When it takes flight, it rises so high as often to be heard after it is lost sight of. Its cry has been sometimes likened to that of a she-goat. The snipes for most part, migrating northwards in the spring, nestle in Germany, Switzerland, Silesia, &c. Some however continue in their more southern stations, making their nest in the month of June, under the root of some alder or willow, in a sheltered place. While the female is hatching, the male is frequently observed to hover around her, uttering a kind of hissing noise. The young quit the nest on issuing from the shell, and then appear very ugly and deformed. Until their bill grows firm, the mother continues her care of them.

The snipe usually grows fat, both in Europe and North America; but much less so in warm climates. Its flesh, after the early frosts, acquires a fine and delicate flavour. It is cooked, as well as the woodcock, without being drawn, and is in universal estimation, as a most exquisite game.

There is a number of species of the woodcock and the snipe, but there is nothing in their habits to induce us to denote them here.

ASIATIC SNIPE.—It has been generally supposed that the common snipe is found distributed over the whole world; but the more minute attention which has lately been paid to the characters of birds has proved the American snipe to be a distinct species, and Prince Charles Bonaparte has named it *Scolopax Wilsonii.* Having lately had an opportunity of examining the bird which the writers on the natural history of India have called the snipe (*Scolopax gallinago,* Horsf. and Raffles, *Lin. Trans.* xiii.) I find it to be equally distinct from the European and American ones. It agrees with the European bird in every character of colour and dimensions; but the tail has, besides its common tail-feathers, a series of small, linear, rigid, incurved, false tail-feathers on each side of the under part, very distinct from the other feathers by their form and rigidity. I propose to call this the Asiatic Snipe, or *Scolopax Horsfieldii,* after the accurate describer of Javanese birds. It is scattered over the continent of India, and is found also at Java, and at Canton, in China.—J. E. GRAY.

In general, during summer, this whole class either choose the coldest countries to retire to, or the coldest and the moistest part of ours to breed in. The curlew, the woodcock, the snipe, the godwit, the grey plover, the green, and the long-legged plover, the knot and the turnstone, are rather the guests than the natives of this island. They visit us in the beginning of winter, and forsake us in the spring. They then retire to the mountains of Sweden, Poland, Prussia, and Lapland, to breed. Our country, during the summer season, becomes uninhabitable to them. The ground parched up by the heat; the springs dried away; and the vermicular insects already upon the wing; they have no means of subsisting. Their weak and delicately pointed bills are unfit to dig into a resisting soil; and their prey is departed, though they were able to reach its retreats. Thus, that season when nature is said to teem with life, and to put on her gayest liveries, is to them an interval of sterility and famine. The coldest mountains of the north are then a preferable habitation; the marshes there are never totally dried up; and the insects are in such abundance, that both above ground and underneath, the country swarms with them. In such retreats, therefore, these birds would continue always; but that the frosts, when they set in, have the same effect upon the face of the landscape, as the heats of summer. Every brook is stiffened into ice; all the earth is congealed into one solid mass; and the birds are obliged to forsake a region where they can no longer find subsistence.

Such are our visitants. With regard to those which keep with us continually, and breed here, they are neither so delicate in their food, nor perhaps so warm

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JACK SNIPE.—It would appear to originate from the singularly solitary habits of the jack-snipe (*Scolopax gallinula*), that young sportsmen are disposed to take it for the male of the common snipe (*S. gallinago*), though it is so very different in size and even in plumage. "The jack-snipe," says Mr. Knapp, "is a solitary, unsocial bird, an anchorite from choice. With the exception of our birds of prey, the manner of whose existing requires it, and a few others, all the feathered tribe seem to have a general tendency towards association, either in flocks, family parties, or pairs; but the individuals of this species pass a large portion of their lives retired and alone, two of them being rarely, or, perhaps, never, found in company, except in the breeding season. They are supposed to pair and raise their young in the deep marshy tracts or reedy districts of the fen-counties, which afford concealment from every prying eye, and safety from all common injuries. Driven by the frosts of winter from these watery tracts, their summer's covert, they separate, and seek for food in more favoured situations, preferring a little, lonely open spring, trickling from the side of a hill, tangled with grass and foliage, or some shallow, rushy streamlet in a retired valley. Having fixed on such a place, they seldom abandon it long, or quit it for another, and though roused from it, and fired at repeatedly through the day, not any sense of danger seems to alarm them; and if we should seek for the little judcock on an ensuing morning, we find it at its spring again. The indifference with which it endures this persecution is amazing. It will afford amusement or vexation to the young sportsman throughout the whole Christmas vacation; and from the smallness of its body, will finally often escape from all its diurnal dangers.

"The causes that influence this snipe to lead so solitary a life are particularly obscure, as well as those which stimulate some others to congregate, as we comprehend no individual benefit to arise from such habits. Wildfowl, the rook, and some other birds, derive security, perhaps, from feeding in society, as a sentinel appears to be placed by them at such times, to give notice of danger. But our congregating small birds take no such precaution; security or mutual protection does not seem to be obtained by it, as the largeness of the flocks invites danger; and warmth in the winter season it does not afford. For the purposes of migration, such associations are, in many respects, serviceable and consistent; but, in our resident species, considered in its various results, it becomes rather a subject of conjecture than of explanation. Timid creatures generally associate, commonly upon the apprehension of danger, and, without yielding any mutual support, become only the more obnoxious to evil; and this snipe, though its habits are the very reverse of connexion with its species, yet affords no clue to direct us to the causes of its unusual habits. These associations of some, and retirement of others, are not the capricious actions of an hour in a few individuals; but so regularly and annually observed in the several species, that they are manifestly appointed provisions of nature, though the object is unknown."—JOURNAL OF A NATURALIST.

in their constitutions. The lapwing, the ruff, the red-shank, the sand-piper, the sea-pie, the Norfolk plover, and the sea-lark, breed in this country, and, for the most part reside here. In summer they frequent such marshes as are not drid up in any part of the year; the Essex hundreds, and the fens of Lincolnshire. There, in solitudes formed by surrounding marshes, they breed and bring up their young. In winter they come down from their retreats, rendered uninhabitable by the flooding of the waters; and seek their food about our ditches and marshy meadow-grounds. Yet even of this class, all are wanderers upon some occasions; and take wing to the northern climates, to breed and find subsistence. This happens when our summers are peculiarly dry; and when the fenny countries are not sufficiently watered to defend their retreats.

But though this be the usual course of nature, with respect to these birds, they often break through the general habits of their kind; and as the lapwing, the ruff, and the sand-piper, are sometimes seen to alter their manners, and to migrate from hence, instead of continuing to breed here; so we often find the wood-cock, the snipe, and the curlew reside with us during the whole season, and breed their young in different parts of the country. In Casewood, about two miles from Tunbridge, as Mr. Pennant assures us, some woodcocks are seen to breed annually.* The young have been shot there in the beginning of August; and were as healthy and vigorous as they are with us in winter, though not so well tasted. On the Alps and other high mountains, says Willughby, the woodcock continues all summer. I myself have flushed them on the top of Mount Jura, in June and July. The eggs are long, of a pale red colour, and stained with deeper spots and clouds. The nests of the curlew and the snipe are frequently found; and some of these perhaps never entirely leave this island.

It is thus that the same habits are in some measure common to all; but in nestling, and bringing up their young, one method takes place universally. As they all run and feed upon the ground, so they are all found to nestle there.

(The Woodcock.)

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* The Woodcock.—During the summer-time the woodcock is an inhabitant of Norway, Sweden, Lapland, and other northern countries, where it breeds. As soon however as the frost commences, it retires southwards to milder climates. These birds arrive in Great Britain in flocks: some of them in October, but not in great numbers till November and December. They generally take advantage of the night, being seldom seen to come before sun-set. The time of their arrival depends considerably on the prevailing winds; for adverse gales always detain them, they not being able to struggle with the boisterous squalls of the Northern Ocean. After their arrival in bad weather, they have often been so much exhausted as to allow themselves to be taken by the hand, when they alighted near the coast. They live on worms and insects, which they search for with their long bills, in soft ground and moist woods, feeding and flying principally in the night. They go out in the evening; and generally return in the same direction, through the same glades, to their day-retreat. The greater part of them leave this country about the latter end of February, or the beginning of March, always pairing before they set out. They retire to the coast, and, if the wind be fair, set out immediately; but, if contrary, they are often detained in the neighbouring woods and thickets for some time. In the crisis the sportsmen are all on the alert, and the whole surrounding country echoes to the discharge of guns; seventeen brace have been killed by one person in a day. But if they are detained long on the dry heaths, they become so lean as to be scarcely eatable. The instant a fair wind springs up, they sieze the opportunity; and where a sportsman has seen hundreds in one day, he will not find a single bird the next.

These birds are remarkably tame during incubation. A person who discovered a woodcock in the nest, often stood over, and even stroked it; notwithstanding it had hatched its young ones, and in due time, disappeared with them.

The number of eggs generally to be seen in every nest, is from two to four, never under, and very seldom exceeding. The nest is made without any art; but the eggs are either laid in some little depression of the earth, or on a few bents and long grass, that scarcely preserve them from the moisture below. Yet such is the heat of the body of these birds, that their time of incubation is shorter than with any others of the same size. The magpie, for instance, takes twenty-one days to hatch its young; the lapwing takes but fourteen. Whether the animal oil with which these birds abound, gives them this superior warmth, I cannot tell; but there is no doubt of their quick incubation.

In their seasons of courtship, they pair as other birds; but not without violent contests between the males, for their choice of the female. The lapwing and the plover are often seen to fight among themselves; but there is one little bird of this tribe, called the ruff, that has got the epithet of the fighter, merely from its great perseverance and animosity on these occasions. In the beginning of spring, when these birds arrive among our marshes, they are observed to engage with desperate fury against each other; it is then that the fowlers, seeing them intent on mutual destruction spread their nets over them, and take them in great numbers. Yet even in captivity their animosity still continues: the people that fat them up for sale, are obliged to shut them up in close dark rooms; for if they let ever so little light in among them, the turbulent prisoners instantly fall to fighting with each other, and never cease till each has killed its antagonist, especially, says Willughby, if any body stands by. A similar animosity, though in less degree, prompts all this tribe; but when they have paired, and begun to lay, their contentions are then over.

The place these birds chiefly choose to breed in, is in some island surrounded with sedgy moors, where men seldom resort; and in such situations I have often seen the ground so strewed with eggs and nests, that one could scarce take a step without treading upon some of them. As soon as a stranger intrudes upon these retreats, the whole colony is up, and a hundred different screams are heard from every quarter. The arts of the lapwing to allure men or dogs from her nest, are perfectly amusing. When she perceives the enemy approaching, she never waits till they arrive at her nest, but boldly runs to meet them: when she has come as near them as she dares to venture, she then rises with a loud screaming before them, seeming as if she were just flushed from hatching; while she is then probably a hundred yards from the nest. Thus she flies, with great clamour and anxiety, whining and screaming round the invaders, striking at them with her wings, and fluttering as if she were wounded. To add to the deceit, she appears still more clamorous, as more remote from the nest.* If she sees them very near, she then seems to be quite unconcerned, and her cries cease, while her terrors are really augmenting. If there be dogs, she flies

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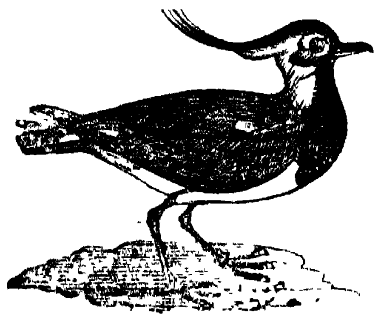
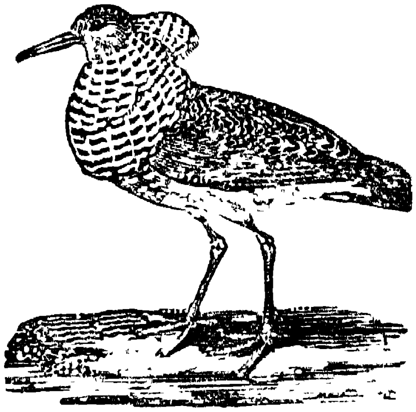


(The Lapwing.)

* **Lapwing.**—An extraordinary anecdote is related by M. Antoine, of a lapwing, which a clergyman kept in his garden. It lived chiefly upon insects, but as the winter drew on, these failed, and necessity compelled the poor bird to approach the house, from which it had previously remained at a wary distance; and a servant hearing its feeble cry, as it were asking charity, opened for it the door of the back-kitchen. It did not venture far at first, but it became daily more familiar and emboldened, as the cold increased, till at length it actually entered the kitchen, though already occupied by a dog and a cat. By degrees it at length came to so good an understanding with these animals, that it entered regularly at nightfall, and established itself at the chimney corner, where it remained snugly beside them for the night; but as soon as the warmth of spring returned, it preferred roosting in the garden, though it resumed its place in the chimney corner the ensuing winter. Instead of being afraid of

heavily at a little distance before them, as if maimed; still vociferous and still bold, but never offering to move towards the quarter where her treasure is deposited. The dog pursues, in hopes every moment of seizing the parent, and by this means actually loses the young; for the cunning bird, when she has thus drawn him off to a proper distance, then puts forth her powers, and leaves her astonished pursuer to gaze at the rapidity of her flight. The eggs of all these birds are highly valued by the luxurious; they are boiled hard, and thus served up, without any further preparation.

As the young of this class are soon hatched, so, when excluded, they quickly arrive at maturity. They run about after the mother as soon as they leave the egg; and being covered with a thick down, want very little of that clutching which all birds of the poultry kind, that follow the mother, indispensably require. They come to their adult state long before winter; and then flock together, till the breeding season returns, which for awhile dissolves their society.


(The Ruff.)

As the flesh of almost all these birds is in high estimation, so many methods have been contrived for taking them. That used in taking the ruff seems to be the most advantageous; and it may not be amiss to describe it. The ruff, which is the name of the male, the reeve that of the female, is taken in nets about forty yards long, and seven or eight feet high.* These birds are chiefly found in Lincolnshire and the Isle of Ely, where they come about the latter end of April, and disappear about Michaelmas. The male of this bird, which is known from all others of the kind by the great length of the feathers round his neck, is yet so various in his plumage that, it is said, no two ruffs were ever seen totally of the same colour. The nets in which these are taken are supported by sticks, at an angle of near forty-five degrees, and placed either on dry ground, or in very shallow water, not remote from reeds: among these the fowler conceals himself, till the birds, enticed by a stale or stuffed bird, come under the nets; he then, by pulling a string, lets them fall, and they are taken—as are godwits, knots, and grey plovers, also, in the same manner. When these birds are brought from under the net, they are not killed immediately, but fattened for the table, with bread and milk, hemp-seed, and sometimes boiled wheat; but if expedition be wanted, sugar is added, which will make them a lump of fat in a fortnight's time. They are kept, as observed before, in a dark room; and judgment is required in taking the proper time for killing them, when they are at the highest pitch of fatness; for, if that is

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its two old acquaintances, the dog and the cat, it now treated them as inferiors, and arrogated to itself the place which it had previously obtained by humble solicitation. This interesting pet was at last choked by a bone which it had incautiously swallowed.—Animæuse Celebres.

* Ruffs.—The trade of catching these birds is confined to a very few persons, and at present scarcely repays their trouble and expense of nets. These people live in obscure places on the verge of the fens, and are found out with difficulty. Two guineas a dozen are given for fattened ruffs. Mr. Towns, the noted feeder at Spalding, assured us his family had been a hundred years in the trade, and boasted that they had served George the Second, and many noble families in the kingdom. He undertook, at the desire of the late Marquis Townshend, when that nobleman was Lord-Lieutenant of Ireland, to take some ruffs to that country; and actually set off with twenty-seven dozen from Lincolnshire; left seven dozen at the Duke of Devonshire's, at Chatsworth; continued his route across the kingdom to Holyhead; and delivered seventeen dozen alive in Dublin; having lost only three dozen in so long a journey, confined and greatly crowded as they were in baskets, which were carried upon two horses.—Montague.

neglected, the birds are apt to fall away. They are reckoned a very great delicacy; they sell for two shillings or half a crown a piece; and are served up to the table with the train, like woodcocks, where we will leave them.*

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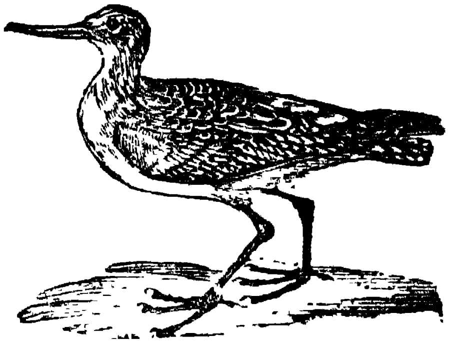
* **The Plovers** habitually frequent the sea coast, the mouths of rivers, and salt marshes. They feed upon crustacea and small molluscous animals, which they catch in the sand, along the line of waters over which they are seen continually flying, uttering a little cry. Many species live solitarily, or in couples; some others in small flocks. These birds are to be found in almost all the countries of the globe, from the equator to the coldest latitudes of the northern and southern hemisphere. They are all clad in sombre colours, the distribution of which is, however, not unpleasing. Most of them undergo a double moulting, and are vested in various liveries, according to age and sex. Some species have spines, which serve as defensive weapons, attached to their wings; some others have fleshy appendages at the base of the bill. The plovers emigrate every year, in flocks of greater or less numbers; and this principally takes place in autumn, during the rainy season, whence their French name (*pluviers*) is derived, and of which our word, plover, is an obvious corruption. At this time they are seen in the greatest abundance. They do not remain quiet when on the ground, but are seen in incessant motion. They fly in an extended file, or in transverse zones, very narrow, and of a great length. Their flesh is delicate and much esteemed. They are frequently taken in great quantities, in the countries where they are common, by means of nets variously fabricated.

The **Golden Plover** is the first and most common. In winter it is very common on the coasts of France and Holland. It is found in England during the entire year; it is also very abundant in the Highlands of Scotland, in the Western Islands, and in the Isle of Man. These plovers strike the earth with their feet, to cause worms, &c., to issue from their retreat. When they are seeking for food, several of them act as sentinels, and on the appearance of any danger set up a shrill cry, as a warning to the others, and a signal for flight. These flocks disperse in the evening; but at the dawn of day, the first that awakes gives a cry of appeal to the rest, which immediately reassemble on this call. This cry is imitated by the fowlers to draw these birds into their nets. The flesh of these birds is in high estimation.



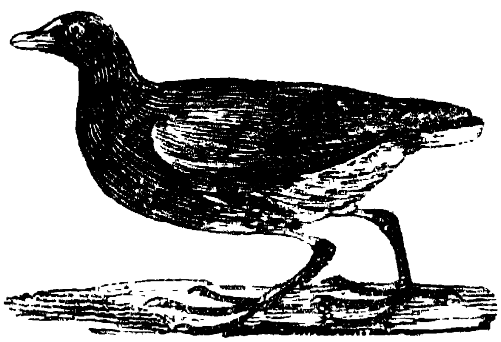
(The Godwit.)

The **Godwits** are to be distinguished from the foregoing. The woodcocks, properly so called, inhabit woods. The snipes live in fresh-water marshes; but the godwits prefer the sea-shore. The passage of the last into the temperate climates of Europe takes place in September; and, for their short stay, they frequent salt marshes, where, like the snipes, &c., they live on small worms which they draw out of the mud. Those which are sometimes to be met with in inland places have doubtless been driven there by the wind. Mauduyt, who observed some of them exposed for sale in the Parisian markets, in spring, concluded, and justly, that they make a second passage in spring, and not that they ever nestle on the French coasts. These timid birds, whose sight moreover is weak, remain in the shade during the daytime, and it is only by evening twilight, or early dawn, that they proceed in search of food, for the discrimination of which their bill is particularly fitted. Little stones are sometimes found in their gizzard; but we cannot conclude that these hard substances answer with them, as with the gallinæ, for the trituration of their food, which is too soft to require anything of the kind, but rather that they have been taken in along with it. Their flesh is excellent eating.

CHAP. XI.

THE WATER-HEN AND THE COOT.

Before we enter upon water-fowls, properly so called, two or three birds claim our attention, which seem to form the shade between the web-footed tribe and those of the crane kind. These partake rather of the form than the habits of the crane; and, though furnished with long legs and necks, rather swim than wade. They cannot properly be called web-footed; nor yet are they entirely destitute of membranes, which fringe their toes on each side, and adapt them for swimming. The birds in question are the Water-hen and the Bald Coot.



(The Water-hen.)

These birds have too near an affinity not to be ranked in the same description. They are shaped entirely alike, their legs are long, and their thighs partly bare; their necks are proportionable, their wings short, their bills short and weak, their colour black, their foreheads bald and without feathers, and their habits entirely the same. These, however, naturalists have thought proper to range in different classes, from very slight distinctions in their figure. The water-hen weighs but fifteen ounces; the coot twenty-four. The bald part of the forehead in the coot is black; in the water hen it is of a beautiful pink colour. The toes of the water-hen are edged with a straight membrane; those of the coot have it scolloped and broader.

The differences in the figure are but slight; and those in their manner of living still less. The history of the one will serve for both. As birds of the crane kind are furnished with long wings, and easily change place, the water-hen, whose wings are short, is obliged to reside entirely near those places where her food lies: she cannot take those long journeys that most of the crane kind are seen to perform; compelled by her natural imperfections, as well, perhaps, as by inclination, she never leaves the side of the pond or the river in which she seeks for provision. Where the stream is selvaged with sedges, or the pond edged with shrubby trees, the water-hen is generally a resident there: she seeks her food along the grassy banks, and often along the surface of the water. With Shakspeare's Edgar, she drinks the green mantle of the standing pool; or, at least, seems to prefer those places where it is seen. Whether she makes pond-weed her food, or hunts among it for water-insects, which are found there in great abundance, is not certain. I have seen them when pond-weed was taken out of their stomach. She builds her nest upon low trees and shrubs, of sticks and fibres, by the water side. Her eggs are sharp at one end, white, with a tincture of green spotted with red. She lays twice or thrice in a summer—her young ones swim the moment they leave the egg, pursue their parent, and imitate all her manners. She rears, in this manner, two or three broods in a season; and when the young are grown up, she drives them off to shift for themselves.

As the coot is a larger bird, it is always seen in larger streams, and more remote from mankind. The water-hen seems to prefer inhabited situations: she keeps near ponds, moats, and pools of water, near gentlemen's houses; but the coot keeps in rivers, and among rushy margined lakes. It there makes a nest of such weeds as the stream supplies, and lays them among the reeds, floating on the surface, and rising and falling with the water. The reeds among which it is built keep it fast; so that it is seldom washed into the middle of the stream. But if this happens, which is sometimes the case, the bird sits in her nest, like a mariner in his boat, and steers with her legs her cargo into the nearest harbour: there, having attained her port, she continues to sit in great tranquillity, regardless of the impetuosity of the current; and though the water penetrates her nest, she hatches her eggs in that wet condition.*

CHAP. I.

WATER-FOWL IN GENERAL.

In settling the distinctions among the other classes of birds, there was some difficulty; one tribe encroached so nearly upon the nature and habitudes of another that it was not easy to draw the line which kept them asunder: but in water-fowl nature has marked them for us by a variety of indelible characters, so that it would be almost as unlikely to mistake a land-fowl for one adapted for living and swimming among the waters as a fish for a bird.

The first great distinction in this class appears in the toes, which are webbed together for swimming. As their toes are webbed in the most convenient manner, so are their legs also made most fitly for swift progression in the water. The shortness of the legs, in the web-footed kinds, renders them as unfit for walking on land, as it qualifies them for swimming in their natural element.

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* The Rails.—As bearing some affinity to this genus of birds, we may here notice the Rails, so called from the rattling sound of their cry. These birds, which remain during the day concealed in the grass, seek their food, morning and evening, in the reeds and plants of marshes and meadows. They fly very far, and walk with great agility. They never go in families or flocks. They raise their necks like hens when they are disturbed; and the young quit the nest immediately after birth, and seize, of their own accord, the food which is indicated to them by the mother. To the land-rail, or corn-crake, these remarks are not, perhaps, applicable in all respects.

Land-rails.—In the more southern countries this is a bird of passage. It arrives among us, and in France, about April or May, and disappears in the commencement of October. By its short and sharp cry—*crik, crik,* we recognise its return. On approaching the quarter whence the cry proceeds, the sound is not discontinued, but heard a little farther on, which is occasioned by the bird, which can fly away but with difficulty, running with extreme swiftness through the tufted grass. In consequence of the coincidence between the return and departure of the quails and this bird, the latter has been sometimes deemed the conductor of the former. These birds are insectivorous when young; but the adult add grains, &c., of various kinds, to their aliment.

Water-rails.—These birds run along stagnant waters as fast as the corn-crake does over fields. Sometimes, instead of traversing the water by swimming, it sustains itself on the broad leaves of aquatic plants. Its food consists in insects, snails, shrimps, &c. It makes its nest in the midst of plants, by the side of ponds and streams, and the female lays from six to ten yellowish eggs. The flesh of this bird has a marshy taste, but is, notwithstanding, in some estimation.

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Their stay, therefore, upon land is but short and transitory; and they seldom venture to breed far from the sides of those waters where they usually remain. In their breeding seasons, their young are brought up by the water-side; and they are covered with a warm down, to fit them for the coldness of their situation.

All water-fowl naturally fall into three distinctions. Those of the Gull kind, that, with long legs and round bills, fly along the surface to seize their prey. Those of the Penguin kind, that, with round bills, legs hid in the abdomen, and short wings, dive after their prey; and, thirdly, those of the Goose kind, with flat, broad bills, that lead harmless lives, and chiefly subsist upon insects and vegetables.

These are not speculative distinctions, made up for the arrangement of a system; but they are strongly and evidently marked by Nature. The Gull kind are active and rapacious; constantly, except when they breed, keeping upon the wing; fitted for a life of rapine, with sharp straight bills for piercing, or hooked at the end for holding their fishy prey. In this class we may rank the Albatross, the Cormorant, the Gannet or Soland Goose, the Shag, the Frigate Bird, the Great Brown Gull, and all the lesser tribe of gulls and sea-swallows.

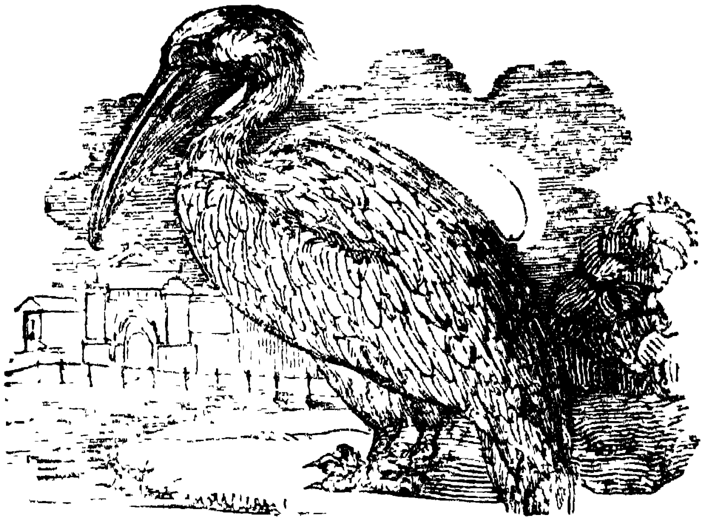
The Penguin kind, with appetites as voracious, bills as sharp, and equally eager for prey, are yet unqualified to obtain it by flight. Their wings are short, and their bodies large and heavy, so that they can neither run nor fly. But they are formed for diving in a very peculiar manner. Their feet are placed so far backward, and their legs so hid in the abdomen, that the slightest stroke sends them head foremost to the bottom of the water. To this class we may refer the Penguin, the Auk, the Skout, the Sea turtle, the Bottle-nose, and the Loon.

The Goose kind are easily distinguishable, by their flat, broad bills, covered with a skin; and their manner of feeding, which is mostly upon vegetables. In this class we may place the Swan, the Goose, the Duck, the Teal, the Widgeon, and all their numerous varieties.

In describing the birds of these three classes, I will put the most remarkable of each class at the beginning of their respective tribes, and give their separate history: then, after having described the chiefs of the tribe, the more ordinary sorts will naturally fall in a body, and come under a general description, behind their leaders. But before I offer to pursue this methodical arrangement, I must give the history of a bird that, from the singularity of its conformation, seems allied to no species, and should, therefore, be separately described—I mean the Pelican.

CHAP. II.

THE PELICAN.


(The Pelican.)

The Pelican of Africa is much larger in the body than a swan, and somewhat of the same shape and colour.[*] Its four toes are all webbed together; and its neck in some measure resembles that of a swan; but that singularity in which it differs from all other birds is in the bill and the great pouch underneath, which are wonderful, and demand a distinct description. This enormous bill is fifteen inches from the point to the opening of the mouth, which is a good way back behind the eyes. At the base of the bill is somewhat greenish, but varies towards the end, being of a reddish blue. It is very thick in the beginning, but tapers off to the end, where it hooks downwards. The under-chap is still more extraordinary; for to the lower edges of it hang a bag, reaching the whole length of the bill to the neck, which is said to be capable of containing fifteen quarts of water. This bag the bird has a power of wrinkling up into the hollow of the under-chap; but by opening the bill, and putting one's hand down into the bag, it may be distended at pleasure. The skin of which it is formed will then be seen of a bluish ash-colour, with many fibres and veins running over its surface. It is not covered with feathers, but a short downy substance, as smooth and as soft as satin, and is attached all along the under edges of the chap, to be fixed backward to the neck of the bird by proper ligaments, and reaches near half way down. When this bag is empty it is not seen; but when the bird has fished with success, it is then incredible to what an extent it is often seen dilated; for the first thing the pelican does in fishing is to fill up the bag; and then it returns to digest its burthen at leisure. When the bill is opened to its widest extent, a person may run his head into the bird's mouth, and conceal it in this monstrous pouch, thus adapted for very singular purposes.

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[*] **The Pelican.**—"This bird," says Buffon, "would be the largest of water-birds, were not the body of the albatross more thick, and the legs of the flamingo so much longer. Its neck-pouch is capable of containing twenty pints, or more, of water, which caused it to be called by the Egyptians *River Camel*, and it swallows into this sack, in a single fishing, as much fish as would serve for the repast of six men." It must appear surprising, that a bird of such vast dimensions, (it is sometimes six feet long, from point of bill to end of tail, and twelve feet from wing-tip to wing-tip,) should be able to fly with as much facility as it swims; but its entire skeleton does not weigh a pound and a half; and its bones are so slight, that they are even transparent. Moreover, a fact observed by Lory on the communication of air even into the bones and the tubes of the feathers in birds, has been verified, in a more especial manner, on the pelicans, by Mery, who has proved the immense quantity of air contained under the skin, and in the cellular tissue. This evidently contributes to augment the volume of the body without increasing the weight, and to render the action of flight more easy.

Such is the formation of this extraordinary bird, which is a native of Africa and America. The pelican was once also known in Europe, particularly in Russia; but it seems to have deserted our coasts.[*] This is the bird of which so many fabulous accounts have been propagated: such as its feeding its young with its own blood, and its carrying a provision of water for them in its great reservoir in the desert.[†] But the absurdity of the first account answers itself; and as for the latter, the pelican uses its bag for very different purposes than that of filling it with water.

Its amazing pouch may be considered as analagous to the crop in other birds, with this difference, that as theirs lies at the bottom of the gullet, so this is placed at the top. Thus, as pigeons and other birds macerate their food for their young in their crops, and then supply them, so the pelican supplies its young by a more ready contrivance, and macerates their food in its bill, or stores it for its own particular sustenance.

The ancients were particularly fond of giving this bird admirable qualities and parental affections: struck, perhaps, with its extraordinary figure, they were willing to supply it with as extraordinary appetites; and having found it with a large reservoir, they were pleased with turning it to the most tender and parental uses. But the truth is, the pelican is a very heavy, sluggish, voracious bird, and very ill-fitted to take those flights, or to make those cautious provisions for a distant time, which we have been told they do. Father Labat, who seems to have studied their manners with great exactness, has given us a minute history of this bird, as found in America; and from him I will borrow mine.

The pelican, says Labat, has strong wings, furnished with thick plumage of an ash colour, as are the rest of the feathers over the whole body. Its eyes are very small, when compared to the size of its head; there is a sadness in its countenance, and its whole air is melancholy. It is as dull and reluctant in its motions as the flamingo is sprightly and active. It is slow of flight; and when it rises to fly, performs it with difficulty and labour. Nothing, as it would seem, but the spur of necessity could make these birds change their situation, or induce them to ascend into the air; but they must either starve or fly.

They are torpid and inactive to the last degree, so that nothing can exceed their indolence but their gluttony; it is only from the stimulations of hunger that they are excited to labour; for otherwise they would continue always in fixed repose. When they have raised themselves above thirty or forty feet above the surface of the sea, they turn their head with one eye downwards, and continue to fly in that posture. As soon as they perceive a fish sufficiently near the surface, they dart down upon it with the swiftness of an arrow, seize it with unerring certainty, and store it up in their pouch. They then rise again, though not without great labour, and continue hovering and fishing, with their head on one side as before.

This work they continue with great effort and industry till their bag is full, and then they fly to land to devour and digest at leisure the fruits of their industry. This, however, it would appear they are not long performing; for towards night they have another hungry call; and they again reluctantly go to labour. At night, when their fishing is over, and the toil of the day crowned with success, these lazy birds retire a little way from the shore; and, though with the webbed feet and clumsy figure of a goose, they will be contented to perch no where but upon trees among the light and airy tenants of the forest. There they take their repose for the night; and often spend a great part of the day, except such times as they are fishing, sitting in dismal solemnity, and as it would seem half a sleep. Their attitude is, with the head resting upon their great bag, and that resting upon their breast. There they remain without motion, or once changing their situation, till the calls of hunger break their repose, and till they find it indispensably necessary to fill their magazine for a fresh meal. Thus their life is spent between sleeping and eating; and our author adds, that they are as foul as they are voracious, as they are every moment voiding excrements in heaps as large as one's fist.*

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[*] Native Of.—These birds are somewhat rare in European cabinets, and in the old continent; they appertain more to warm than cold climates; the are very common in Africa, on the borders of the Senegal and the Gambia; where the negroes call them *Pokko;* on the coasts of Angola, of Sierra Leone, and Guinea—at Madagascar, Siam, and China—in the Sundas, Phillippine, and Manilla Islands.[*] They have also been met with in America, from the Antilles, the Isthmus of Panama, and the Bay of Campeachy, as far as Louisiana and Hudson's Bay, also in the southern parts of Australia.

[†] Like fabled bird, that mystic lives,
On that death-stream its bosom gives.

The same indolent habits seem to attend them even in preparing for incubation, and defending their young when excluded. The female makes no preparation for her nest, nor seems to choose any place in preference to lay in; but drops her eggs on the bare ground to the number of five or six, and there continues to hatch them. Attached to the place, without any desire of defending her eggs or her young, she tamely sits and suffers them to be taken from under her. Now and then she just ventures to peck, or to cry out when a person offers to beat her off.

Gesner tells us that the emperor Maximilian had a tame pelican which lived for above eighty years, and that always attended his army on their march. It was one of the largest of the kind, and had a daily allowance by the emperor's orders. As another proof of the great age to which the pelican lives, Aldrovandus makes mention of one of these birds that was kept several years at Mechlin, and was verily believed to be fifty years old. We often see these birds at our shows about town.

CHAP. III.

THE ALBATROSS, THE FIRST OF THE GULL KIND.

Though this is one of the largest and most formidable birds of Africa and America, yet we have but few accounts to enlighten us in its history. The figure of the bird is thus described by Edwards: "The body is rather larger than that of a pelican; and its wings, when extended, ten feet from tip to tip. The bill, which is six inches long, is yellowish, and terminates in a crooked point. The top of the head is of a bright brown; the back is of a dirty, deep, spotted brown; and the belly and under the wings is white; the toes, which are webbed, are of a flesh-colour."

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* Habits — Economy. — A singularity, which the pelican partakes in common with many palmated birds, is that of perching on trees; but it does not nestle there, but constructs on the ground a nest, a foot and a half in diameter, furnished internally with soft plants, in which the female lays two, three, or four white eggs, pretty like those of a swan, and of equal size at both ends.

The flesh of the pelican was forbidden to the Jews, as unclean: a prohibition almost unnecessary, from its ill taste and marshy odour. It may, however, be used for its oil, and has been in request in America for that reason. The pouches of these birds have also been used to hold tobacco; and this skin, when dressed, becomes, it is said, as soft as that of a lamb. Shot pouches, sailors' caps, &c., are also made of it, and the fishermen of the Nile make vessels of it to empty their boats of the water, preserving the bones of the jaw.

It is said that the pelican of Europe is not subject to a double moulting; the young, however, differ much from the old, and do not assume the plumage of the adult for many years. There is scarcely any difference between the sexes.

The individuals which are reared in captivity eat rats and other small mamifera; and they snap up and eat apart the pieces which are thrown to them. It might, perhaps, be possible to employ these birds in fishing, as the Chinese do the corvorant; and, in fact, Père Labat informs us that the savages of the Western Islands have succeeded in doing this.

This bird is an inhabitant of the tropical climates, and also beyond them as far as the Streights of Magellan in the South Seas.* It is one of the most

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* **Remarks on the Albatross.**—The ocean has its own peculiar birds as well as the land. Compelled to traverse incessantly its solitudes to obtain their subsistence, they are endowed with a wonderful power of flight, so that in a few hours they are able to cross immense distances, and to betake themselves to those places to which their instinct directs them. Among these numerous tribes there exists distinctions of manners as decided as the physical characters by which they are classified; and this induces us to give the name of Birds of the Ocean) *oiseaux pelagiens*), properly so called, to the petrels and the albatrosses. The former are found in every sea, under every meridian, and in almost every latitude. Except the short time which they devote to rearing their young, all the rest of their life is occupied in traversing the ocean, and laboriously seeking in the midst of storms, a scanty sustenance, almost as soon digested as procured; which seems to place them under subjection to a single duty, that of obtaining nourishment.

Boobies (*Sula Bassana*), Noddies (*Sterna*), Men of War Birds (*Pelecanus Aquilus*, L.), and Tropic Birds (*Phaëton erubescens*)—although they occasionally take long flights over the sea, do not deserve the name of Birds of the Ocean: they simply make excursions; and preferring their lonely cliffs to the rocking of the waves, they generally return to them every evening.

The discrimination of the several species of albatross has become a matter of great difficulty, from the many different names that successive travellers have bestowed upon them, and from the difference between the sexes, as well as from the change which takes place in the same individual at different ages and at different seasons of the year.

The greatest number of albatrosses are met with between the 55th and 59th parallel of latitude; and probably in that direction they may have no boundary but the polar ice. Although they are to be met with over the whole of this vast space, there are some places for which they have a preference, and in which they are found in greater numbers than elsewhere. They are most abundant about the Cape of Good Hope and about Cape Horn, and both these places are well known to be almost constantly the scenes of very violent storms. The petrels are more numerous, and more widely diffused, since they are to be met with from pole to pole, and they vary very much in size. The albatross is distinguishable by its great size; but one species of the petrel (*Procellaria gigantea*) is nearly as large, while another species is as different from this as a sparrow from a goose.

It is certain that fish do serve for food to the albatross and petrel, although they were never seen pursuing the flying-fish, which are said to fall a prey to them when they leave the deep, and, betaking themselves to their wings to avoid the enemy in the water, only encounter a new danger in the albatross; nor were any remains, either of these or of the mollusca—which, as it were, cover these seas, and would alone be sufficient to satisfy one of these birds for a whole day—ever found in their stomachs. We have seen them surrounded with Sea-blubbers, Physaliæ, Salpæ, &c., but these afforded them no nourishment; they invariably sought other food. This was not the case with cuttlefish and calmars, fragments of which were constantly found in their stomachs.

One circumstance which could not escape notice during our long voyages, is the habit—we should almost say the necessity—which these birds are under of frequenting rough seas. The tempest itself does not alarm them; and when the wind is blowing most furiously, they may be seen wheeling about without appearing at all affected by it.—When, on the other hand, the face of the ocean is smoothed by a calm, they fly to other regions, again to appear with the return of winds and storms. No doubt the reason of this is, that the agitation of the waves brings to their surface those marine animals which serve for food to these birds. It is from the same reason that they keep near the eddying and disturbance occasioned by the passing of a vessel through the water. This design was clearly demonstrated to us when approaching the Cape of Good Hope. We were accompanied by a great number of small petrels, of the size of kingfishers, who were busy skimming the surface of the water in a line of exactly the width of our track. None were to be seen anywhere else. We took great care that nothing should be thrown from the corvette, and yet we saw them every instant darting their bills into the water to seize some object which we were unable to distinguish.

The duration, the rapidity, the strength, and the manner of flight of these birds in general, has been a subject of study and astonishment to us. Their agility in casting themselves, like a harpoon, on their prey, in raising it with their beak, their activity in striking the backs of the waves with their foot, or in traversing their long unsteady fierce and formidable of the aquatic tribe, not only living upon fish, but also such small water-fowl as it can take by surprise. It preys, as all the gull-kind do, upon the wing, and chiefly pursues the flying-fish, that are forced from the sea by the dolphins. The ocean in that part of the world presents a very different appearance from the seas with which we are surrounded. In our seas we see nothing but a dreary expanse, ruffled by winds, and seemingly forsaken by every class of animated nature. But the tropical seas, and the distant southern latitudes beyond them, are all alive with birds and fishes, pursuing and pursued. Every various species of the gull kind are there seen hovering on the wing, at a thousand miles' distance from the shore. The flying-fish are every moment rising to escape from their pursuers of the deep, only to encounter equal dangers in the air. Just as they rise, the dolphin is seen to dart after them, but generally in vain; the gull has more frequent success, and often takes them at their rise; while the albatross pursues the gull, and obliges it to relinquish its prey: so that the whole horizon presents but one living picture of rapacity and evasion.

But though this bird be one of the most formidable tyrants of the deep, there are some associations which even tyrants themselves form, to which they are induced either by caprice or necessity. The albatross seems to have a peculiar affection for the penguin, and a pleasure in its society. They are always seen to choose the same places of breeding: some distant, uninhabited island, where the ground slants to the sea, as the penguin is not formed either for flying or climbing. In such places their nests are seen together, as if they stood in need of mutual assistance and protection. Captain Hunt, who for some time commanded at our settlement upon Falkland Islands, assures me, that he was often amazed at the union preserved between these birds, and the regularity

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ridges, where sometimes the only spectacle which the solitudes of the ocean had to offer to us.

One of the peculiar characters of these palmipedes (web-footed birds) is, that their flight is effected almost entirely by sailing as it were through the air. If they do some times flap their wings, it is in order to raise themselves more quickly; but such instances are rare. In the albatross, which was principally remarked upon, both from its great size and from its approaching nearer to the ships, it was observed that their long wings were concave underneath, and that they did not show any apparent vibration in whatever position the bird might be; whether when skimming the surface of the wave they regulated their flight by its undulations, or when rising into the air they described wide circles around the vessel.

Land birds of prey who fly in this way without moving their wings, are generally descending towards the earth when they adopt this mode of flight; while the petrel and the albatross easily raise themselves up into the air, turn quickly round by means of their tail, and go on in the face of the highest wind without their progress appearing to be at all diminished by its force, and without any apparent motion being imparted to their wings. But still we must admit that some impulse is given to the air which sustains them—although we cannot perceive it, it is true, since it probably is exerted at the end of very long levers (at the extremities of their wings); for, otherwise, we cannot conceive how the progressive motion of the animal is accomplished. The exceedingly long wings which many of these birds possess, spoil the beauty of their figure when closed, as they produce a thickness in the posterior part of the body. It is when flying that they display themselves to the greatest advantage; and they are endowed with a wonderful strength to enable them to perform their flights. When in 59° south latitude, where there is scarcely any night as long as the sun is under the tropic of Capricorn, we have seen the same petrels sailing on the wing several days together without interruption. The petrels do not dive after their food, but if it lies only at a certain depth, they endeavour to seize it by forcing part of their body under water.

From what has been said, it appears, that the mere presence of these birds is not a sure sign of the approach of land.

With respect to the incubation of these pelagic birds, the French naturalists observe that the petrels flock in immense numbers to the "Isles Malouines," along the shores of which their eggs are deposited in such abundance as to be a source of subsistence to the seamen employed in the seal fishery. They were also informed that these birds arrange their eggs with much order, and, living as it were in a republic, exercise by turns the function of incubation in this kind of temporary establishment.

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with which they built together. In that bleak and desolate spot, where the birds had long continued undisturbed possessors, and no way dreaded the encroachments of men, they seemed to make their abode as comfortable as they expected it to be lasting. They were seen to build with an amazing degree of uniformity; their nests covering fields by thousands, and resembling a regular plantation. In the middle, on high, the albatross raised its nest, on heath sticks and long grass, about two feet above the surface: round this the penguins made their lower settlements, rather in holes in the ground; and most usually eight penguins to one albatross. Nothing is a stronger proof of Buffon's fine observation, that the presence of man not only destroys the society of meaner animals, but their instincts also. These nests are now, I am told, totally destroyed; the society is broken up, and albatross and penguin have gone to breed upon more desert shores, in greater security.

CHAP. IV.

THE CORMORANT.

The Cormorant is about the size of a large Muscovy duck, and may be distinguished from all other birds of this kind, by its four toes being united by membranes together: and by the middle toe being toothed or notched like a saw, to assist it in holding its fishy prey. The head and neck of this bird are of a sooty blackness; and the body thick and heavy, more inclining in figure to that of the goose than the gull. The bill is straight, till near the end, where the upper chap bends into a hook.

(The Cormorant.)

But notwithstanding the seeming heaviness of its make, there are few birds more powerfully predaceous. As soon as the winter approaches, they are seen dispersed along the sea-shore, and ascending up the mouths of fresh-water rivers, carrying destruction to all the finny tribe. They are most remarkably voracious, and have a most sudden digestion. Their appetite is for ever craving, and never satisfied. This gnawing sensation may probably be increased by the great quantity of small worms that fill their intestines, and which their unceasing gluttony contributes to engender.

Thus formed with the grossest appetites, this unclean bird has the most rank and disagreeable smell, and is more fœtid than even carrion, when in its most healthful state. Its form, says an ingenious modern, is disagreeable; its voice is hoarse and croaking; and all its qualities obscene. No wonder then that Milton should make Satan personate this bird, when he sent him upon the basest purposes, to survey with pain the beauties of paradise, and to sit devising death on the tree of life. (*g*) It has been remarked, however, of our poet, that the making a water-fowl perch on a tree, implied no great acquaintance with

(*g*) Vide Pennant's Zoology, p. 477.

the history of nature. In vindication of Milton, Aristotle expressly says, that the cormorant is the only water-fowl that sits on trees. We have already seen the pelican of this number; and the cormorant's toes seem as fit for perching upon trees as for swimming: so that our epic bard seems to be as deeply versed in natural history as in criticism.

Indeed, this bird seems to be of a multiform nature; and wherever fish are to be found, watches their migrations. It is seen as well by land as sea; it fishes in fresh-water lakes, as well as in the depths of the ocean; it builds in the cliffs of rocks, as well as on trees; and preys not only in the day-time, but by night.

Its indefatigable nature, and its great power in catching fish, were probably the motives that induced some nations to breed this bird up tame, for the purposes of fishing; and Willughby assures us, it was once used in England for that purpose.*

As for the rest, the cormorant is the best fisher of all birds; and though fat and heavy with the quantity it devours, is nevertheless generally upon the wing. The great activity with which it pursues, and from a vast height drops down to dive after its prey, offers one of the most amusing spectacles to those who stand upon a cliff on the shore. This large bird is seldom seen in the air, but where there are fish below; but then they must be near the surface, before it will venture to souse upon them. If they are at a depth beyond what the impetus of its flight makes the cormorant capable of diving to, they certainly escape him; for this bird cannot move so fast under water as the fish can swim. It seldom, however, makes an unsuccessful dip; and is often seen rising heavily, with a fish larger than it can readily devour. It sometimes also happens that the cormorant has caught the fish by the tail; and consequently the fins prevent its being easily swallowed in that position. In this case, the bird is seen to toss its prey above its head, and very dexterously to catch it, when descending, by the proper end, and so swallow it with ease.†

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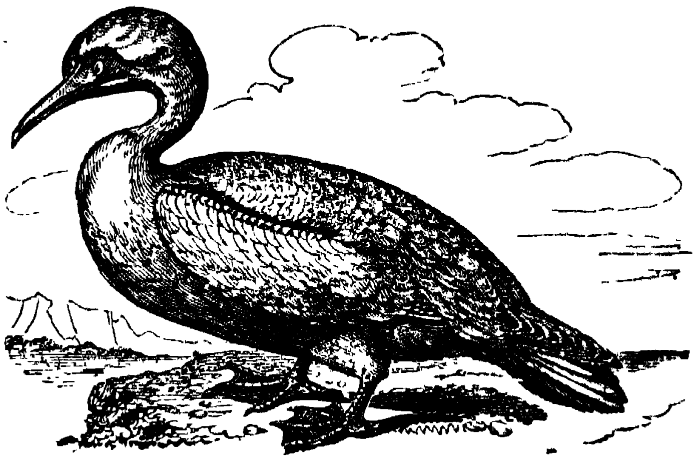
* The Chinese Corvorant.—The following account of this bird is the most authentic of any that has yet been given us:—"The embassy had not proceeded far on the southern branch of the Imperial Canal, when they arrived in the vicinity of a place where the Leu-tze, or famed fishing-bird of China, is bred, and instructed in the art of supplying his owner with fish in great abundance. It is a species of the pelican, resembling the common corvorant; but on a specimen being submitted to Dr. Shaw, he has distinguished it in the following terms: Brown pelican, or corvorant, with white throat; the body whitish beneath; the tail rounded; the irides blue; the bill yellow. On a large lake close to this part of the canal, and to the eastward of it, are thousands of small boats and rafts built entirely for this species of fishing. On each boat or raft are ten or a dozen birds, which, at a signal from the owner, plunge into the water; and it is astonishing to see the enormous size of the fish with which they return grasped within their bills. They appear to be so well trained, that it did not require either ring or cord about their throats to prevent them from swallowing any portion of their prey, except what their master was pleased to return to them for encouragement and food. The boat used by these fishermen is of a remarkably light make, and is often carried to the lake, together with the fishing-birds, by the men who are there to be supported by it."—Sir George Staunton.

Corvorants are common on many of our sea-coasts, building their nests on the highest trees of the cliffs that hang over the sea. In winter they disperse along the shores, and visit the fresh waters, where they commit great depredation amongst the fish. They are remarkably voracious, having a most sudden digestion—promoted, perhaps, by the infinite quantity of small worms that fill their intestines. They are very wary, except when they have filled their stomachs, when they become so stupid, that it is frequently an easy matter to catch them in a net, or even by means of a noose thrown over their heads. We are informed by the Rev. Mr. Bingly, that in the year 1798, he saw one that had been seized by the hand, when perched at the top of a rock just behind the town of Caernarvon. And in the year 1793, one of them was observed sitting on the vane of St. Martin's steeple, Ludgate-hill, London, and was shot there, in the presence of a great number of people.

† Habits.—It is no uncommon thing to see twenty of these birds together on the rocks of the sea-coast, with extended wings, drying themselves in the wind. In this position they remain sometimes nearly an hour, without once closing their wings; and as soon as they are sufficiently dry to enable the

CHAP. V.

THE GANNET OR SOLAND GOOSE.



(The Soland Goose.)

The Gannet is of the size of a tame goose, but its wings much longer, being six feet over. The bill is six inches long, straight almost to the point, where it inclines down, and the sides are irregularly jagged, that it may hold its prey with greater security. It differs from the cormorant in size, being larger; — in its colour, which is chiefly white; and by its having no nostrils, but in their place a long furrow that reaches almost to the end of the bill. From the corner of the mouth is a narrow slip of black, bare skin, that extends to the hind part of the head; beneath the skin is another that, like the pouch of the pelican, is dilatable, and of size sufficient to contain five or six entire herrings, which in the breeding season it carries at once to its mate or its young.

These birds, which subsist entirely upon fish, chiefly resort to those uninhabited islands where their food is found in plenty, and men seldom come to disturb them. The islands to the north of Scotland, the Skelig islands, off the coasts of Kerry, in Ireland, and those that lie in the North Sea, off Norway, abound with them. But it is on the Bass Island, in the Firth of Edinburgh, where they are seen in the greatest abundance. "There is a small island," says the celebrated Harvey, "called the Bass, not more than a mile in circumference. The surface is almost wholly covered, during the months of May and June, with their nests, their eggs, and young. It is scarcely possible to walk without treading on them: the flocks of birds upon the wing are so numerous as to darken the air like a cloud; and their noise is such that one cannot, without difficulty, be heard by the person next to him. When one looks down upon the sea from the precipice, its whole surface seems covered with infinite numbers of birds of different kinds, swimming and pursuing their prey. If, in sailing round the island, one surveys its hanging cliffs, in every crag or fissure of the broken rocks, may be seen innumerable birds, of various sorts and sizes, more than the stars of heaven when viewed in a serene night. If they are viewed at a distance, either receding, or in their approach to the island, they seem like one vast swarm of bees."

They are not less frequent upon the rocks of St. Kilda. Martin assures us that the inhabitants of that small island consume annually near twenty-three

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feathers to imbibe the oil, they press the substance from the receptacle on their rumps, and dress the feathers with it. It is only in one particular state that the oily matter can be spread on them — when they are somewhat damp; and the instinct of the birds teaches them the proper moment.

and are used by the Greenlanders, when sewed together, and put into proper form, for garments; and the skin of the jaws, like that of others of this tribe, serves these people for bladders to buoy up their smaller kinds of fishing darts.

housand young birds of this species, besides an amazing quantity of their eggs. On these they principally subsist throughout the year; and from the number of these visitants, make an estimate of their plenty for the season. They preserve both the eggs and fowls in small pyramidal stone buildings, covering them with turf ashes, to prevent the evaporation of their moisture.

The gannet is a bird of passage. In winter it seeks the more southern coasts of Cornwall, hovering over the shoals of herrings and pilchards that then come down from the northern seas. Its first appearance in the northern islands is in the beginning of spring; and it continues to breed till the end of summer. But, in general, its motions are determined by the migrations of the immense shoals of herrings that come pouring down at that season through the British Channel, and supply all Europe as well as this bird with their spoil. The gannet assiduously attends the shoal in their passage, keeps with them in their whole circuit round our island, and shares with our fishermen this exhaustless banquet. As it is strong of wing, it never comes near the land; but is constant to its prey. Wherever the gannet is seen, it is sure to announce to the fishermen the arrival of the finny tribe; they then prepare their nets, and take the herrings by millions at a draught; while the gannet, who came to give the first information, comes, though an unbidden guest, and often snatches its prey from the fishermen even in their boat. While the fishing season continues, the gannets are busily employed; but when the pilchards disappear from our coasts, the gannet takes its leave to keep them company.

The cormorant has been remarked for the quickness of his sight; yet in this the gannet seems to exceed him. It is possessed of a transparent membrane under the eyelid, with which it covers the whole eye at pleasure, without obscuring the sight in the smallest degree. This seems a necessary provision for the security of the eyes of so weighty a creature, whose method of taking prey, like that of the cormorant, is by darting headlong down from a height of a hundred feet and more into the water to seize it. These birds are sometimes taken at sea, by fastening a pilchard to a board, which they leave floating. The gannet instantly pounces down from above upon the board, and is killed or maimed by the shock of a body where it expected no resistance.

These birds breed but once a year, and lay but one egg, which being taken away, they lay another; if that is also taken, then a third; but never more for that season. Their egg is white, and rather less than that of the common goose; and their nest large, composed of such substances as are found floating on the surface of the sea. The young birds, during the first year, differ greatly in colour from the old ones; being of a dusky hue, speckled with numerous triangular white spots; and at that time resembling the colours of the speckled diver.

The Bass Island, where they chiefly breed, belongs to one proprietor; so that care is taken never to fright away the birds when laying, or to shoot them upon the wing. By that means, they are so confident as to alight and feed their young ones close beside you. They feed only upon fish, as was observed; yet the young gannet is counted a great dainty by the Scots, and sold very dear; so that the lord of the islet makes a considerable annual profit by the sale.

CHAP. VI.

SMALLER GULLS AND PETRELS.

HAVING described the manners of the great ones of this tribe, those of the smaller kinds may be easily inferred. They resemble the more powerful in their appetites for prey, but have not such certain methods of obtaining it. In general, therefore, the industry of this tribe and their audacity increase in proportion to their imbecility. The great gulls live at the most remote distance from man; the smaller are obliged to reside wherever they can take their prey, and to come into the most populous places when solitude can no longer grant them a supply. In this class we may place the GULL, properly so called, of which there are above twenty different kinds; the PETREL, of which there are three; and the SEA SWALLOW, of which there are as many.* The gulls may

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* The LITTLE STORMY PETREL (*Thalassidroma pelagica*, Vigors) breeds in the Orkneys. Mr. Scarth states that, in passing over a tract of peat-moss, near the shore, in a small uninhabited island in Orkney, one evening in the month of August last, he was surprised to hear a low, purring noise, somewhat resembling the sound of a spinning-wheel in motion; and, on inquiry, he was informed by one of the boatmen who accompanied him, that it was the noise commonly emitted by the Alimonty (the Orkney name for the stormy petrel), that frequented the island when hatching.

On examining a small hole in the ground, he found the bird and its nest, which was very simple, being little more than a few fragments of shells laid on the bare turf. It contained two round, pure-white eggs, which were very large in comparison with the size of the bird. When he seized the bird, she squirted out of her mouth an oily substance of a very rancid smell. He took her home, and having put her into a cage, he offered her various kinds of worms to eat; but, as far as he could observe, she ate nothing till after the expiration of four days, when he observed that she occasionally drew the feathers of her breast singly across, or rather through her bill, and appeared to suck an oily substance from them. This induced him to smear her breast with common train oil; and, observing that she greedily sucked the feathers, he repeated the smearing two or three times in each day for about a week. He then placed a saucer containing oil in the cage, and he observed that she regularly extracted the oil by dipping her breast in the vessel, and then sucked the feathers as before. In this way he kept her for three months. After feeding, she sat quietly at the bottom of the cage, sometimes making the same purring noise which first attracted his notice, and sometimes whistling very shrilly.

The PETRELS have received this denomination whimsically enough. Besides the faculty of swimming, they possess that of supporting themselves on the water by striking very rapidly with their feet, which has caused them to be compared to *St. Peter* walking upon the water. The petrels are to be seen in all seas of the globe from one pole to the other. They are the inseparable companions of mariners during their long navigations. The flight of these birds is almost always performed by hovering, and without presenting apparent vibrations. They rise with facility, and can fly against the strongest winds, which never slacken their movements. The tempest not only does not affright them, but they are almost necessitated to seek those seas where the agitation of the waves brings to the surface those marine animals which constitute their food. In consequence of this, they are frequently seen in all weathers in the vortices which are formed by the track of vessels. "It is, indeed, an interesting sight," says Wilson, "to observe these little birds in a gale, coursing over the waves, down the declivities, and up the ascents of the foaming surf that threatens to burst over their heads, sweeping along the hollow troughs of the sea as in a sheltered valley, and again mounting with the rising billow; and, just above its surface, occasionally dropping their feet, which, striking the water, throw them up again with additional force—sometimes leaping, with both legs parallel, on the surface of the roughest waves for several yards at a time. Meanwhile they continue coursing from side to side of the ship's wake, making excursions far and wide to the right and left, now a great way ahead, and now shooting astern for several hundred yards, returning again to the ship, as if she were all the while be distinguished by an angular knob on the lower chap; the petrels by their wanting this knob; and the sea swallow by their bills, which are straight, slender, and sharp pointed. They all, however, agree in their appetites and their places of abode.

The gull, and all its varieties, are very well known in every part of the kingdom. It is seen with a slow-sailing flight hovering over rivers to prey upon the smaller kinds of fish; it is seen following the ploughman in fallow fields to pick up insects; and when living animal food does not offer, it has even been known to eat carrion and whatever else of the kind that offers. Gulls are found in great plenty in every place; but it is chiefly round our boldest, rockiest shores that they are seen in the greatest abundance; it is there that the gull breeds and brings up its young; it is there that millions of them are heard screaming with discordant notes for months together.

Those who have been much upon our coasts know that there are two different kinds of shores; that which slants down to the water with a gentle declivity, and that which rises with a precipitate boldness, and seems set as a bulwark to repel the force of the invading deeps. It is to such shores as these that the whole tribe of the gull kind resort, as the rocks offer them a retreat for their young, and the sea a sufficient supply. It is in the cavities of these rocks, of which the shore is composed, that the vast variety of sea-fowls retire to breed in safety. The waves beneath, that continually beat at the base, often wear the shore into an impending boldness; so that it seems to jut out over the water, while the raging of the sea makes the place inaccessible from below. These are the situations to which sea-fowl chiefly resort, and bring up their young in undisturbed security.

stationary, though, perhaps, running at the rate of ten knots an hour. But the most singular peculiarity of this bird is its faculty of standing, and even running, on the surface of the water, which it performs with apparent facility. When any greasy matter is thrown overboard, these birds instantly collect around it, facing to windward, with their long wings expanded, and their webbed feet patting the water. The lightness of their bodies, and the action of the wind on their wings, enable them with ease to assume this position. In calm weather they perform the same manœuvre, by keeping their wings just as much in action as to prevent their feet from sinking below the surface.

"There are few persons who have crossed the Atlantic that have not observed these solitary wanderers of the deep skimming along the surface of the wild and wasteful ocean. Habited in mourning, and making their appearance generally in greater numbers previous to or during a storm, they have long been fearfully regarded by the ignorant and superstitious, not only as the foreboding messengers of tempests and danger to the hapless mariner, but as wicked agents, connected somehow or other in creating them. 'Nobody,' say they, 'can tell anything of where they come from, or how they breed,' though (as sailors sometimes say) it is supposed that they hatch their eggs under their wings as they sit on the water.' This mysterious uncertainty of their origin, and the circumstances above recited, have doubtless given rise to the opinion so prevalent among this class of men, that they are in some way or other connected with the prince of the power of the air. In every country where they are known, their names have borne some affinity to this belief. They have been called witches, stormy petrels, the devil's birds, and Mother Cary's chickens, probably from some celebrated ideal hag of that name; and their unexpected and numerous appearance has frequently thrown a momentary damp over the mind of the hardiest seaman. It is the business of the naturalist, and the glory of philosophy, to examine into the reality of these things; to dissipate the clouds of error and superstition wherever they darken and bewilder the human understanding, and to illustrate nature with the radiance of truth.

"The popular opinion among sailors, that the petrels carry their eggs under their wings in order to hatch them, is no less unfounded than the fancy of their causing storms. On the contrary, petrels have been ascertained to breed on rocky shores, in numerous communities, like the bank swallow, making their nests in the holes and cavities of the rocks above the sea, returning to feed their young only during the night with the superabundant oily food from their stomachs. The quantity of this oily matter is so considerable that, in the Fero Islands, they use petrels for candles, with no other preparation than drawing a wick through the body of the birds, from the mouth to the rump.

"While nestling they make a cluttering or croaking noise, similar to frogs, which may be heard during the whole night on the shores of the Bahama and Bermuda islands."—AMERICAN ORNITHOLOGY.

Those who have never observed our boldest coasts have no idea of their tremendous sublimity.* The boasted works of art, the highest towers, and the noblest domes, are but anthills when put in comparison: the single cavity of a rock often exhibits a coping higher than the cieling of a Gothic cathedral. The face of the shore offers to the view a wall of massive stone ten times higher than our tallest steeples. What should we think of a precipice three quarters of a mile in height—and yet the rocks of St. Kilda are still higher! What must be our awe to approach the edge of that impending height, and to look down on the unfathomable vacuity below: to ponder on the terrors of falling to the bottom, where the waves that swell like mountains are scarcely seen to curl on the surface, and the roar of an ocean a thousand leagues broad appears softer than the murmur of a brook! It is in these formidable mansions that myriads of sea-fowls are for ever seen sporting, flying in security down the depth, half a mile beneath the feet of the spectator. The crow and the chough avoid those frightful precipices; they choose smaller heights, where they are less exposed to the tempest: it is the cormorant, the gannet, the tarrock, and the terne, that venture to these dreadful retreats, and claim an undisturbed possession. To the spectator from above, those birds, though some of them are above the size of an eagle, seem scarce as large as a swallow; and their loudest screaming is scarce perceptible.

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* **The Frigate-Bird.**—The habits and manners of the feathered race possess so much of intrinsic interest, and display so much of the wisdom of the Almighty, that we cannot for a moment wonder at the delight which a mind rightly tuned experiences in the study of this department of the kingdom of nature. The examination of a single feather may lead to the most important deductions: its lightness, its warmth, its fitness, are at once evident; but in addition to all this, an experienced naturalist will be able to tell by the index alone which it affords, the habits, the leading features, nay, often the very genus to which its possessor belongs; so marked is the evidence of design—so clearly are the means in connexion with the end. This statement, if true as it regards a single feather, is much more evident as applied to general structure and conformation, in which the propriety of the design for accomplishing a certain end may not only be traced, but absolutely forces itself so strongly on our notice, "that he who runs may read." Let us, to illustrate our position, take the frigate-bird (*Tacyhpetes aquilus*, Vieill) as an example.

This bird is among the most singular of the feathered race: while, on the one hand, its place in nature would appear, from its webbed feet, to be among the water-birds that sport on the ocean's surface, on the other hand, its rapacious habits ally it to the falcons, or birds of prey that strike their quarry on the wing. The truth is, that it forms the link which unites these two extremes of a long chain of gradations, and either party may claim it with almost equal propriety. Although an ocean-bird, its province is not the water, but the air; it neither swims nor dives, nor rests on the billows like the gull. Its feet are indeed webbed, but the webs are very partial; the *tarsi* (or legs, as they are generally called) scarcely half an inch in length, the whole limb very short, and covered to the feet with long loose feathers; the tail is long and forked, the wings of extraordinary spread, and the general plumage deficient in that close and downy texture which always characterizes a bird whose *habitat* is the surface of the deep. Its conformation, on the other hand, as manifestly declares it to be aërial;—aërial, not with the land below, on which it may repose and rest when weary—but aërial with the ocean below, on which it never rests, and which, affording it its food, does all that is required.

The frigate-bird is to be met with principally between the tropics, hundreds of leagues from land, to which, except for the purpose of hatching its young, it never resorts. It is ever on the wing, often soaring so high as to be scarcely visible; at other times skimming at a moderate distance from the water, and darting with the rapidity of an arrow upon any unfortunate fish which approaches the surface so as to be within the reach of its beak. The flying-fish are its special prey: driven by the dolphin out of the water to trust to their fan-like wings, they are pounced upon by this voracious bird, who, not content to limit himself to the procuring of food by his own labours, attacks gulls and other sea birds that have just made a successful capture, and obliges them to give up their booty. In his ferocious disposition and mode of taking his prey on the wing, as well as in the curved or hook-like termination of his beak, he resembles the falcon tribe, nor less so in the powers of maintaining a rapid and lengthened flight, in which he excels every other bird. We have said that he is met with hundreds of leagues from land; in fact there is but one purpose, that of hatching and rearing the young, for which this bird ever resorts there; under ordinary circumstances it continues ever on the wing over the ocean, reposing on outspread pinions in the higher regions of the air, where, without any effort, it can remain suspended. The strangeness of this fact will be removed when we inform our readers of the mechanical contrivance with which the bird is furnished. Beneath the throat is situated a large pouch, capable of being distended with air from the lungs, with which, as well as with the hollow bones of the wings, it immediately communicates. The bones of the wings themselves, besides being hollow, are extremely long and light—thus this pouch or sack beneath the throat and these tubes are filled with rarified air, forming an apparatus analogous to a balloon, which requires little else but the wings themselves to be spread, to be enabled by its buoyancy to sustain the weight of the body in the atmosphere. In the female, the pouch is not near so large; in other respects she resembles the male, except that the plumage is more obscure, and the neck and under parts of a dirty white.

The length of the male, including the long forked tail, is three feet; expanse of wing, eight; the air-pouch, red; the general plumage dark umbre brown. Its motions in the air are very graceful and sweeping. It is said to build in rocks or tall trees; but of its nidification little is correctly ascertained.

But the generality of our shores are not so formidable. Though they may rise two hundred fathom above the surface, yet it often happens that the water forsakes the shore at the departure of the tide, and leaves a noble and delightful walk for curiosity on the beach. Not to mention the variety of shells with which the sand is strewed, the lofty rocks that hang over the spectator's head, and that seem but just kept from falling, produce in him no unpleasing gloom. If to this be added the fluttering, the screaming, and the pursuits of myriads of water-birds, all either intent on the duties of incubation, or roused at the presence of a stranger, nothing can compose a scene of more peculiar solemnity. To walk along the shore when the tide is departed, or to sit in the hollow of a rock when it is come in, attentive to the various sounds that gather on every side, above and below, may raise the mind to its highest and noblest exertions. The solemn roar of the waves, swelling into and subsiding from the vast caverns beneath, the piercing note of the gull, the frequent chatter of the guillemot, the loud note of the auk, the scream of the heron, and the hoarse, deep, periodical croaking of the cormorant, all unite to furnish out the grandeur of the scene, and turn the mind to him who is the essence of all sublimity.

These birds, like all others of the rapacious kind, lay but few eggs; and hence, in many places, their number is daily seen to diminish. The lessening of so many rapacious birds may, at first sight, appear a benefit to mankind; but when we consider how many of the natives of our islands are sustained by their flesh, either fresh or salted, we shall find no satisfaction in thinking that these poor people may in time lose their chief support. The gull, in general, as was said, builds on the ledges of rocks, and lays from one egg to three, in a nest formed of long grass and sea-weed. Most of the kind are fishy tasted, with black, stringy flesh; yet the young ones are better food: and of these, with several other birds of the penguin kind, the poor inhabitants of our northern islands make their wretched banquets. They have been long used to no other food; and even salted gull can be relished by those who know no better. If it be true that such meat as is the most dangerously earned is the sweetest, no men can dine so luxuriously as these, as none venture so hardily in the pursuit of a dinner. In Jacobson's History of the Feroe Islands, we have an account of the method in which those birds are taken, and I will deliver it in his own simple manner:—

"It cannot be expressed with what pains and danger they take these birds in those high, steep cliffs, whereof many are two hundred fathoms high. But there are men apt by nature and fit for the work, who take them usually in two manners: they either climb from below into these high promontories, that are as steep as a wall, or they let themselves down with a rope from above. When they climb from below, they have a pole five or six ells long, with an iron hook at the end, which they that are below in the boat or on the cliff, fasten unto the man's girdle, helping him up thus to the highest place where he can get footing: afterwards they also help up another man; and thus several climb up as high as possibly they can, and where they find difficulty they help each other up, by thrusting one another up with their poles. When the first hath taken footing, he draws the other up to him by the rope fastened to his waist; and so they proceed, till they come to the place where the birds build. They there go about as well as they can, in those dangerous places; the one holding the rope at one end, and fixing himself to the rock; the other going at the other end from place to place. If it should happen that he chanceth to fall, the other that stands firm keeps him up, and helps him up again. But if he passeth safe, he likewise fastens himself till the other has passed the same dangerous place also. Thus they go about the cliffs after birds as they please. It often happeneth, however, the more is the pity, that when one doth not stand fast enough, or is not sufficiently strong to hold up the other in his fall, that they both fall down and are killed. In this manner some do perish every year."*

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* The Skua Gull.—A correspondent in Loudon's Magazine of Natural History writes that he undertook an ornithological tour through the islands of Shetland and Orkney, to observe the habits of the skua gull in his favourite haunts. "The skua gull," he says, "called by the natives *Buncie*, is held and cherished by them with the greatest veneration and kindness; and nothing hurts their feelings more than to see the death of their favourite bird. I was particularly requested, upon my first arrival, by two or three elderly natives, to spare this bird; as to the skua were almost entirely trusted the care and protection of their lambs, during the summer months, that are always allowed to wander unrestrained over the island. These birds possess an inveterate dislike against the eagle and raven; for no sooner does the broad and rounded wing of the eagle appear emerging from his rocky habitation amid the cliffs, than the skua descends upon him from the tops of the mountains, in bodies of three or four, and never fail to force the eagle to a precipitate retreat. The natives always reward his services by casting from their boats the refuse portion of the fresh-caught fish, which he seizes with greedy avidity, snatching it almost from the hands of the fisherman.

"I was particularly amused one evening, when standing at the foot of the loftiest hill (called by the natives Snuge), with the following circumstance. An eagle was returning to his eyry, situated in the face of the western crags, in appearance perfectly unconscious of approaching so near to his inveterate foe, as, in general, the eagle returns to the rocks from the sea, without ever crossing the smallest portion of the island. This time, however, he was making a short cut of it, by crossing an angle of the land. Not a bird was discernible:—a solitary skua might, indeed, be occasionally seen, wheeling his circling flight around the summit of the mountain, which was already assuming its misty mantle. As I was intently observing the majestic flight of the eagle, on a sudden he altered his direction, and descended hurriedly as if in the act of pouncing; in a moment, five or six of the skua passed over my head with an astonishing rapidity; their wings partly closed and perfectly steady, without the slightest waver or irregularity. They appeared, when cleaving the air, like small fragments of broken rock, torn and tossed by a hurricane from the summit of a towering cliff, until, losing the power that supported them, they fell prone to the sea beneath. The gulls soon came up with him, as their descent was very rapid, and a desperate engagement ensued. The short bark of the eagle was clearly discernible above the scarcely distinguished cry of the skua, who never ventured to attack his enemy in front; but, taking a short circle around him, until his head and tail were in a direct line, the gull made a desperate sweep or stoop, and, striking the eagle on the back, he darted up again almost perpendicular; when, falling into the rear, he resumed his cowardly attack. Three or four of these birds, thus passing in quick succession, invariably succeed in harassing the eagle most unmercifully. If, however, he turns his head previously to the bird's striking, the gull quickly ascends without touching him. This engagement continued some time, the eagle wheeling and turning as quickly as his ponderous wings would allow, until I lost the combatants in the rocks. As soon as this is the case, the gulls leave, and quietly return to the mountain."

The Stormy Petrel.—The same writer observes of this adventurous little bird—"As the stormy petrel is scarcely ever to be seen near the land, except in very boisterous weather, one of the natives, for a trifling remuneration, agreed to traverse the face of this rock, and take me some from out its fissures. Accordingly, accoutred with a rope of hemp and hogs' bristles, coiled over his shoulders, he proceeded to the cliff, having made one end fast by means of a stake, he threw the coil over the face of the rock, and gradually lowered himself down, but with the utmost caution and circumspection, carefully pressing his foot hard upon the narrow ridges before he at all loosened his firm grasp of the rope,

CHAP. VII.

THE PENGUIN KIND: AND FIRST OF THE GREAT MAGELLANIC PENGUIN.

THE gulls are long-winged, swift flyers, that hover over the most extensive seas, and dart down upon such fish as approach too near the surface. The PENGUIN kind are but ill fitted for flight, and still less for walking.—Everybody must have seen the awkward manner in which a duck, either wild or tame, attempts to change place. They must recollect with what softness and ease a gull or a kite waves its pinions, and with what a coil and flutter the duck attempts to move them; how many strokes it is obliged to give in order to gather a little air, and even when it is thus raised, how soon it is fatigued with the force of its exertions, and obliged to take rest again. But the duck is not, in its natural state, half so unwieldy an animal as the whole tribe of the penguin kind. Their wings are much shorter, more scantily furnished with quills, and the whole pinion placed too forward to be usefully employed. For this reason, the largest of the penguin kind, that have a thick, heavy body to raise, cannot fly at all. Their wings serve them rather as paddles to help them forward, when they attempt to move swiftly; and in a manner walk along the surface of the water. Even the smaller kinds seldom fly by choice; they flutter their wings with the swiftest efforts without making way; and though they have but a small weight of body to sustain, yet they seldom venture to quit the water, where they are provided with food and protection.

As the wings of the penguin tribe are unfitted for flight, their legs are still more awkwardly adapted for walking. This whole tribe have all above the knee hid within the belly; and nothing appears but two short legs, or feet, as some would call them, that seem stuck under the rump, and upon which the animal is very awkwardly supported. They seem, when sitting or attempting to walk, like a dog that has been taught to sit up, or to move a minuet. Their short legs drive the body in progression from side to side; and were they not assisted by their wings, they could scarcely move faster than a tortoise.

This awkward position of the legs, which so unqualifies them for living upon land, adapts them admirably for a residence in water. In that, the legs placed

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which he never altogether abandoned. I had previously thrown myself upon my chest, to enable me to have a better view of him, by looking over the cliff; and, certainly, to see the dexterity and bravery with which he threw himself from one aperture to another was truly grand. The tumbling roar of the Atlantic was foaming many hundreds of feet beneath, and dashing its curling, cream-like surge against the dark base of the cliff, in sheets of the most beautiful white; while the herring and black-backed gulls, alternately sweeping past him so as to be almost in reach of his arm, threw a wildness into the scene by the discordant scream of the former, and the laughing, oft-repeated bark of the latter. This, however, he appeared entirely to disregard; and, continuing his search, returned in about half an hour with seven or eight of the stormy petrel tied up in an old stocking, and a pair of the Manks puffins, together with their eggs. The birds, he told me, he had no difficulty in capturing. The eggs of the stormy petrel are surprisingly large, considering the diminutive size of the bird, being as large as those of the thrush. The female lays two eggs, of a dirty or dingy white, encircled at the larger end by a ring of fine, rust-coloured freckles. The birds merely collect a few pieces of dried grass, with a feather or two, barely sufficient to prevent the eggs from rolling or moving on the rock. That of the Manks' puffin (the bird laying but one) is of a very round shape, and uniformly white, very much resembling that of a hen. These birds very often excavate a small hole, if the stratum is soft enough to admit of it, like the common puffin) *Alca arctica*. L), by means of their small, sharp claws, on the ground of which they deposit their single eggs."—MAGAZINE OF NATURAL HISTORY.

behind the moving body, pushes it forward with greater velocity; and these birds, like Indian canoes, are the swiftest in the water, by having their paddles in the rear.

Nor are they less qualified for diving than swimming. By ever so little inclining their bodies forward, they lose their centre of gravity, and every stroke from their feet only tends to sink them the faster. In this manner they can either dive at once to the bottom, or swim between two waters; where they continue fishing for some minutes, and then ascending, catch an instantaneous breath, to descend once more to renew their operations. Hence it is that these birds, which are so defenceless, and so easily taken by land, are impregnable by water. If they perceive themselves pursued in the least, they instantly sink, and show nothing more than their bills, till the enemy is withdrawn. Their very internal conformation assists their power of keeping long under water. Their lungs are fitted with numerous vacuities, by which they can take in a very large inspiration; and this probably serves them for a length of time.

As they never visit land, except when they come to breed, their feathers take a colour from their situation. That part of them which has been continually bathed in the water, is white; while their backs and wings are of different colours, according to the different species. They are also covered more warmly all over the body with feathers, than any other birds whatever, so that the sea seems entirely their element; and but for the necessary duties of propagating the species, we should scarcely have the smallest opportunity of seeing them, and should be utterly unacquainted with their history.

Of all this tribe, the Magellanic Penguin is the largest, and the most remarkable.* In size it approaches near that of a tame goose. It never flies, as its wings are very short, and covered with stiff, hard feathers, and are always seen expanded, and hanging uselessly down by the bird's sides. The upper part of the head, back, and rump, are covered with stiff, black feathers; while the belly and breast, as is common with all of this kind, are of a snowy whiteness, except a line of black that is seen to cross the crop. The bill, which from the base to about half way is covered with wrinkles, is black, but marked crosswise with a stripe of yellow. They walk erect, with their heads on high, their fin-like wings hanging down like arms: so that to see them at a distance, they look like so many children with white aprons. From hence they are said to unite in themselves the qualities of men, fowls and fishes. Like men, they are upright; like fowls, they are feathered; and like fishes, they have fin-like instruments, that beat the water before, and serve for all the purposes of swimming rather than flying.

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* The Crested Penguin.—This is the most beautiful of the penguin tribe, and is nearly two feet in length. These birds have also the name of hopping penguins, and jumping jack, from their action of leaping quite out of the water, sometimes three or four feet, on meeting with any obstacle in their course. They are inhabitants of several of the South Sea Islands.

This species seems to have a greater air of liveliness in its countenance than almost any of the others; yet it is a very stupid bird, and so regardless of its own safety as even to suffer any person to lay hold of it.

When provoked, it erects its crest in a very beautiful manner; and when attacked by our voyagers, we are told that it ran at them in flocks, pecked their legs, and spoiled their clothes. Mr. Forster, in his account of one of the South Sea Islands, says—"When the whole herd was beset, they all became very bold at once, and ran violently at us, biting our legs, or any part of our clothes." They are very tenacious of life. Mr. Forster left a great number of them apparently lifeless, from the blows they had received, while he went in pursuit of others; but they all afterwards got up, and marched off with the utmost gravity. Their sleep is extremely sound; for Dr. Sparrman, accidentally stumbling over one of them, kicked it several yards, without disturbing its rest; nor was it till after it was repeatedly shaken that the bird awoke.

The Crested Penguins form their nests among those of the birds of the pelican tribe, and live in tolerable harmony with them. The female generally lays only one single egg. Their nests are holes in the earth, which they easily form with their bills, throwing back the dirt with their feet.

Perrin, in his "Account of an Expedition to the Falkland Islands, in 1772," mentions a species of penguin that resorts to certain places of these islands in incredible numbers, and lays its eggs. These places, he says, had become, by its long residence, entirely freed from grass, and has given to them the name of towns. These nests were composed of mud, raised into hillocks a foot high, and placed close to each other. "Here," he adds, "during the breeding season, we were presented with a sight that conveyed a most dreary, and, I may say, awful idea of the desertion of the islands by the human species: general stillness prevailed in these towns; and whenever we took our walks among them, in order to provide ourselves with eggs, we were regarded indeed with side-long glances, but we carried no terror with us. The eggs are rather larger than those of a goose, and are laid in pairs. When we took them once, and sometimes twice in a season, they were as often replaced by the birds; but prudence would not permit us to plunder too far, lest a future supply in the next year's brood might be prevented."

They feed upon fish, and seldom come ashore, except in the breeding season. As the seas in that part of the world abound with a variety, they seldom want food; and their extreme fatness seems a proof of the plenty in which they live. They dive with great rapidity, and are voracious to a great degree. One of them, described by Clusius, though but very young, would swallow an entire herring at a mouthful, and often three successively before it was appeased. In consequence of this gluttonous appetite, their flesh is rank and fishy; though our sailors say that it is pretty good eating. In some the flesh is so tough, and the feathers so thick, that they stand the blow of a scimitar without injury.

They are a bird of society; and especially when they come on shore, they are seen drawn up in rank and file, upon the ledge of a rock, standing together with the albatross, as if in consultation. This is previous to their laying, which generally begins in that part of the world in the month of November. Their preparations for laying are attended with no great trouble, as a small depression in the earth, without any other nest, serves for this purpose. The warmth of their feathers and the heat of their bodies is such, that the progress of incubation is carried on very rapidly.

The penguin lays but one egg; and, in frequented shores, is found to burrow like a rabbit. Sometimes three or four take possession of one hole, and hatch their young together. In the holes of the rocks, where Nature has made them a retreat, several of this tribe, as Linnæus assures us, are seen together. There the females lay their single egg in a common nest, and sit upon this their general possession by turns—while one is placed as a sentinel, to give warning of approaching danger. The egg of the penguin, as well as of all this tribe, is very large for the size of the bird, being generally found bigger than that of a goose. But as there are many varieties of the penguin, and as they differ in size from that of a Muscovy duck to a swan, the eggs differ in the same proportion.*

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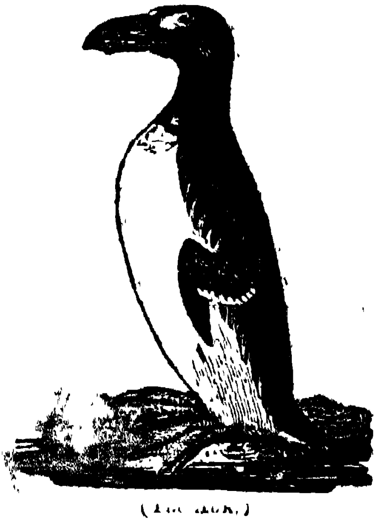
* The Penguin — its Structure —The great peculiarity of structure in this amphibious bird is its great and excessively distended jugular veins being near two inches in diameter. Captain Webster, in a letter to Mr. Barrow, of the Admiralty, on the Natural Productions of Staten Island and Cape Horn, says, I merely mention this one point respecting the anatomy of the penguin, to associate it with the prodigious and enormous abdominal [illegible] of the sea leopard or leopardine seal of Jameson, which you will scarcely credit to be seventeen inches in diameter. That an animal of five or six cwt., and of seven or eight feet in length, should have a venous sinus of seventeen inches diameter, stretching from hypochondrium to hypochondrium, seems incredible; — unparalleled as it is, such is the fact. The skins and heads of five are sent home.—Arcana of Science, 1830.

CHAP. VIII.

AUK, PUFFIN, AND OTHER BIRDS OF THE PENGUIN KIND.

Of a size far inferior to the penguin, but with nearly the same form, and exactly of the same appetites and manners, there is a very numerous tribe. These frequent our shores, and, like the penguin, have their legs placed behind. They have short wings, which are not totally incapable of flight, with round bills for seizing their prey, which is fish. They live upon the water, in which they are continually seen diving; and seldom venture upon land, except for the purposes of continuing their kind.

The first of this smaller tribe is the **Great Northern Diver**, which is nearly of the size of a goose: it is beautifully variegated all over with many stripes, and differs from the penguin, in being much slenderer, and more elegantly formed.* The **Auk**, which breeds on the islands of St. Kilda, and chiefly differs from the penguin in size and colour:† it is smaller than a duck; and the whole of the breast and belly as far as the middle of the throat, is white. The


(THE AUK.)

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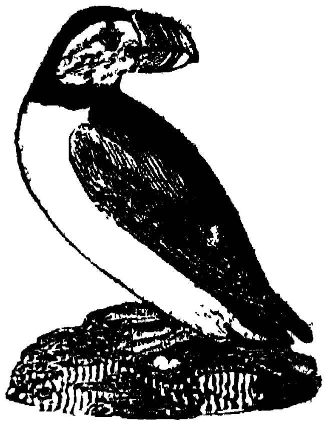
* **The Great Northern Diver** is the principal of the Auk tribe. It is nearly three feet and a half in length. The head and neck are of a deep velvet black; the female is less than the male. It inhabits, chiefly, the northern seas, and is common on some of the coasts of Scotland. Every part and proportion of this bird is most admirably adapted to its mode of life. The head is sharp, and smaller than the part of the neck adjoining, in order that it may pierce the water; the wings are placed forward, and out of the centre of gravity, for a purpose which will be noticed hereafter. The feet are broad for swimming, yet so folded up, when advanced forward to take a fresh stroke, as to be full as narrow as the shank.

Most people, who have exercised any degree of observation, know that the swimming of birds is nothing more than a walking in the water, where one foot succeeds the other, as on land. "But no one, as far as I am aware," says the Rev. Mr. White, "has remarked that diving fowls, while under water, impel and row themselves forward by a motion of their wings, as well as by the impulse of their feet; yet such is really the case, as any one may be easily convinced who will observe ducks when hunted by dogs in a clear pond. Nor do I know that any one has given a reason why the wings of diving-fowls are placed so forward;—doubtless not for the purpose of promoting their speed in flying, since that position certainly impedes it; but probably for the increase of their motion under water, by the use of four oars instead of two; and were the wings and feet nearer together, as in land birds, they would, when in action, rather hinder than assist each other"—Nat. Hist. Selborne.

† **The Auk.**—This species appears to have become extremely rare on the north coast of Britain. The natives in the Orkneys informed Mr. Bullock, in his late tour through those islands, that one male only had made his appearance for a long time, which had regularly visited Papa Westra for several years. The female (which the natives call the queen of the auks) was killed just before Mr. Bullock's arrival. The king, or male, Mr. B. had the pleasure of chasing for several hours, in a six-oared boat, but without being able to kill him; for though he frequently got near him, so expert was the bird in its natural element, that it appeared impossible to shoot him. The rapidity with which he pursued his course under water was almost incredible.

"This bird," says Mr. Rennie, "is only found in the most northern parts of the


(The Puffin.)

Guillemot is about the same size; it differs from the auk in having a longer, a slenderer, and a straighter bill. The Scarlet-throated Diver may be distinguished by its name; and the **Puffin**, or Coulterneb, is one of the most remarkable birds we know. Words cannot easily describe the form of the bill of the puffin, which differs so greatly from that of any other bird. Those who have seen the coulter of a plough, may form some idea of the beak of this odd-looking animal. The bill is flat; but, very different from that of the duck, its edge is upwards. It is of a triangular figure, and ending in a sharp point; the upper chap bent a little downward, where it is joined to the head; and a certain callous substance encompassing its base, as in parrots. It is of two colours; ash-coloured near the base, and red towards the point. It has three furrows or grooves impressed in it: one in the livid part, two in the red. The eyes are fenced with a protuberant skin, of a livid colour; and they are grey or ash-coloured. These are marks sufficient to distinguish this bird by; but its value to those in whose vicinity it breeds, renders it still more an object of curiosity.

The puffin, like all the rest of this kind, has its legs thrown so far back, that it can hardly move without tumbling. This makes it rise with difficulty, and subject to many falls before it gets upon the wing; but as it is a small bird, not much bigger than a pigeon, when it once rises, it can continue its flight with great celerity.

Both this and all the former build no nest; but lay their eggs either in the crevices of rocks, or in holes under ground near the shore. They chiefly choose the latter situation; for the puffin, the auk, the guillemot, and the rest, cannot easily rise to the nest when in a lofty situation. Many are the attempts these birds are seen to make to fly up to those nests which are so high above the surface. In rendering them inaccessible to mankind, they often render them almost inaccessible to themselves. They are frequently obliged to make three or four efforts before they can come at the place of incubation. For this reason the auk and guillemot, when they have once laid their single egg, which is extremely large for the size, seldom forsake it until it is excluded. The male, who is better furnished for flight, feeds the female during this interval; and so

kingdom; is said to breed in the isle of St. Kilda, from which Dr. Fleming had one in 1822. Mr. Bullock informed Dr. Fleming that an individual was taken in a pond of fresh water, two miles from the Thames, on the estate of Sir William Clayton, in Buckinghamshire. When fed in confinement, it holds up its head, expressing its anxiety by shaking the head and neck, and uttering a gurgling noise. It dives under water, even with a long cord attached to its foot, with incredible swiftness.

Puffin Auk.—This is a bird of passage on our coasts, and on those of France and Holland, where it arrives in March or April. A great number of them perish in their passage, and their dead bodies are driven on shore by the wind. These birds are not frightened by the presence of man, nor even do they show much fear of shot. Their cry is a grave sound, and their flight is sometimes considerably elevated, notwithstanding the smallness of their wings. They couple on the water, like ducks; and towards the middle of May the females lay—in burrows, already made, or in holes which the lightness of the soil enables them to excavate several feet in depth—a single white egg, as large as that of a young hen. We are informed by a French writer, that when the female perceives any attempt to take away her egg, she pushes it behind her with her feet, to the bottom of the hole, and remains boldly at the entrance to defend it. These birds retire in autumn with their young.

It is reported by Buck, in his voyage to Norway and Lapland, that the natives have a singular mode of catching these birds when they are in considerable numbers. We quote it here, but without pledging ourselves for its authenticity. When, by the assistance of a noose, the fowler has succeeded in getting out the foremost one, as each bird seizes the tail of that which precedes, they are all drawn with ease out of the hole which they occupy.

bare is the place where she sits, that the egg would often roll down from the rock, did not the body of the bird support it.

But the puffin seldom chooses these inaccessible and troublesome heights for its situation. Relying on its courage, and the strength of its bill, with which it bites most terribly, it either makes or finds a hole in the ground, where to lay and bring forth its young. All the winter these birds, like the rest, are absent, visiting regions too remote for discovery. At the latter end of March, or the beginning of April, come over a troop of their spies or harbingers, that stay two or three days, as it were, to view and search out for their former situations, and see whether all be well. This done, they once more depart; and, about the beginning of May, return again with the whole army of their companions. But if the season happens to be stormy and tempestuous, and the sea troubled, the unfortunate voyagers undergo incredible hardships; and they are found, by hundreds, cast away upon the shores, lean and perished with famine. (*g*) It is most probable, therefore, that this voyage is performed more on the water than in the air; and as they cannot fish in stormy weather, their strength is exhausted before they can arrive at their wished-for harbour.

The puffin, when it prepares for breeding, which always happens a few days after its arrival, begins to scrape up a hole in the ground not far from the shore; and when it has some way penetrated the earth, it then throws itself upon its back, and with bill and claws thus burrows inward, till it has dug a hole, with several windings and turnings, from eight to ten feet deep. It particularly seeks to dig under a stone, where it expects the greatest security. In this fortified retreat it lays one egg; which, though the bird be not much bigger than a pigeon, is of the size of a hen.

When the young one is excluded, the parent's industry and courage is incredible. Few birds or beasts will venture to attack them in their retreats. When the great sea-raven, as Jacobson informs us, comes to take away their young, the puffins boldly oppose him. Their meeting affords a most singular combat. As soon as the raven approaches, the puffin catches him under the throat with its beak, and sticks its claws into his breast, which makes the raven, with a loud screaming, attempt to get away; but the little bird still holds fast to the invader, nor lets him go till they both come to the sea, where they drop down together, and the raven is drowned. Yet the raven is but too often successful; and invading the puffin at the bottom of its hole, devours both the parent and its family.

The constant depredation which these birds annually suffer does not in the least seem to intimidate them, or drive them away. On the contrary, as the people say, the nest must be robbed, or the old ones will breed there no longer. All birds of this kind lay but one egg; yet if that be taken away, they will lay another, and so on to a third; which seems to imply that robbing their nests does not much intimidate them from laying again. Those, however, whose nests have been thus destroyed, are often too late in bringing up their young; who, if they be not fledged, or prepared for migration when all the rest depart, are left at land to shift for themselves. In August the whole tribe is seen to take leave of their summer residence; nor are they observed any more till the return of the ensuing spring. It is probable that they sail away to more southern regions, as our mariners frequently see myriads of water-fowl upon their return, and steering usually to the north. Indeed, the coldest countries seem to be their most favoured retreats; and the number of water-fowl is much greater in those colder climates, than in the warmer regions, near the line. The quantity of oil which abound in their bodies serves as a defence against cold, and preserves them in vigour against its severity; but the same provision of oil is rather detrimental in warm countries, as it turns rancid, and many of them die of disorders which arise from its putrefaction. In general, however, water-fowl can be properly said to be of no climate—the element upon which they

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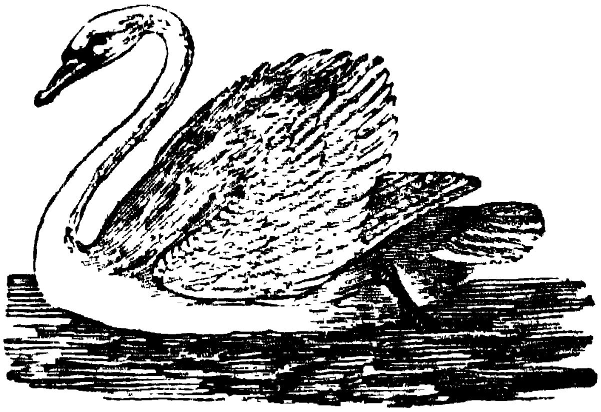
(*g*) Willughby's Ornithology, p. 326.

ice being their proper residence. They necessarily spend a few months of summer upon land, to bring up their young; but the rest of their time is probably consumed in their migrations, or near some unknown coasts, where their provision of fish is found in greatest abundance.*

CHAP. IX.

BIRDS OF THE GOOSE KIND, PROPERLY SO CALLED.



(Tame Swan.)

THE SWAN, the Goose, and the Duck, are leaders of a numerous, useful, and beautiful tribe of birds, that we have reclaimed from a state of nature, and have taught to live in dependence about us. To describe any of these would be as superfluous as definitions usually are when given of things with which we are already well acquainted. There are few that have not had opportunities of seeing them, and whose ideas would not anticipate our description. As their food is simple, so their flesh is nourishing and wholesome. The swan was considered as a high delicacy among the ancients; the goose was abstained from as totally indigestible. Modern manners have inverted tastes; the goose is now become the favourite; and the swan is seldom brought to the table unless for the purposes of ostentation. But at all times the flesh of the duck was in high esteem: the ancients thought even more highly of it than we do. We are contented to eat it as a delicacy; they also considered it as a medicine; and Plutarch assures us that Cato kept his whole family in health, by feeding them with duck whenever they threatened to be out o order.

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* THE GUILLEMOT.—To these birds the attribute of stupidity has been generally applied; yet probably without sufficient reflection on the peculiar conformation of the individual, and the inconveniences which must result from that conformation. The wings are so short and narrow, that the guillemot can scarcely flutter. The legs, from their position, are quite unfit for the purpose of walking; and the natural element of the bird is only on the bosom of the sea, where it swims with the greatest swiftness, and even dives below the ice.

The guillemots are nearly strangers to the temperate climates of Europe; though Pennant, on the authority of a note communicated to him by Scopoli, tells us that they are to be seen upon the coasts of Italy. They are very common on those of Norway, of Iceland, of the Feroë Islands, at Spitzbergen, Kamtschatka, Terra Nuova, at Nootka, and on the northern coasts of America and Asia. These birds, whose wings are fit only for a feeble flight, and one of short duration, on the surface of the arctic seas, rather employ them to accelerate their motions on the water, when in pursuit of fish, marine insects, &c., which constitute their food. It is also by the assistance of these short wings that they clear the projecting edges of rocks, or jump from point to point, to the precipitous situations in which they build their nests.

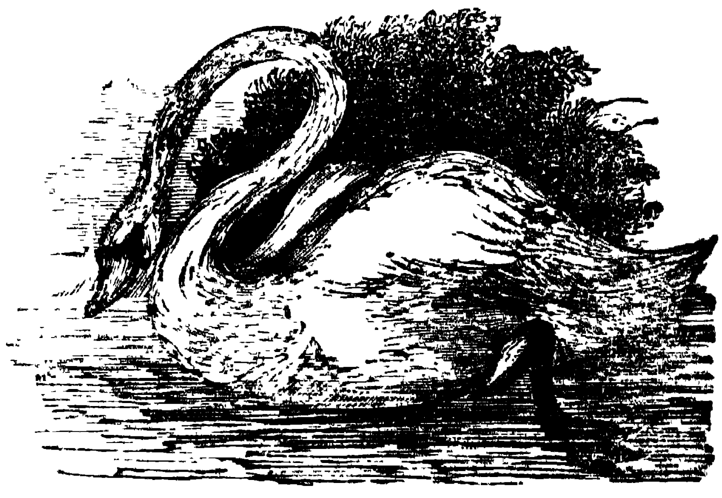
Though accustomed to the most rigorous cold, and often seen upon the floating islands of ice, yet, as they can find subsistence only in an open sea, they are forced to migrate in cases of complete frost. They then descend along our coasts and those of Holland and France, where families have been known to remain and establish themselves among the rocks.

These qualities of great fecundity, easy sustenance, and wholesome nourishment, have been found so considerable as to induce man to take these birds from a state of nature, and render them domestic. How long they have been thus dependents upon his pleasures is not known, for from the earliest accounts they were considered as familiars about him. The time must have been very remote, for there have been many changes wrought in their colours, their figures, and even their internal parts, by human cultivation. The different kinds of these birds, in a wild state, are simple in their colourings. When one has seen a wild goose or a wild duck, a description of its plumage will, to a feather, exactly correspond with that of any other. But in the tame kinds no two of any species are exactly alike. Different in their size, their colours, and frequently in their general form, they seem the mere creatures of art; and, having been so long dependent upon man for support, they seem to assume forms entirely suited to his pleasures or necessities.

CHAP. X.

THE SWAN, TAME AND WILD.

No bird makes a more indifferent figure upon land, or a more beautiful one in the water, than the SWAN.* When it ascends from its favourite element, its motions are awkward, and its neck is stretched forward with an air of stupidity; but when it is seen smoothly sailing along the water, commanding a thousand graceful attitudes, moving at pleasure without the smallest effort, when it "proudly rows its state," as Milton has it, "with arched neck, between its white wings mantling," there is not a more beautiful figure in all nature. In the exhibition of its form, there are no broken or harsh lines; no constrained or catching motions; but the roundest contours, and the easiest transitions; the eye wanders over every part with insatiable pleasure and every part takes a new grace with new motion.



(Wild Swan.)

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* THE SWAN. — Of these species, that which is known, improperly with reference to a large portion of the individuals that compose it, as the tame swan, is probably the most common, being found in a state of domestication throughout the greater part of the northern hemisphere. In a wild state it is met with in almost every country of Europe, especially towards the east, and is particularly abundant in Siberia.

The wild birds of this species, like most of the water-fowl, are migratory in their habits

This fine bird has long been rendered domestic; and it is now a doubt whether there be any of the tame kind in a state of nature. The wild swan, though so strongly resembling this in colour and form, is yet a different bird; for it is very differently formed within. The wild swan is less than the tame, almost a fourth; for as the one weighs twenty pounds, the other only weighs sixteen pounds and three quarters. The colours of the tame swan is all over white; that of the wild bird is, along the back and the tips of the wings, of ash-colour. But these are slight differences, compared to what are found upon dissection. In the tame swan, the wind-pipe sinks down into the lungs in the ordinary manner; but in the wild, after a strange and wonderful contortion, like what we have seen in the crane, it enters through a hole formed in the breast-bone; and being reflected therein, returns by the same aperture; and being contracted into a narrow compass by a broad and bony cartilage, it is divided into two branches, which, before they enter the lungs, are dilated and as it were swollen out into two cavities.[*]

In the temperate regions of Europe, they begin to absent themselves in October, and return towards the end of March to the quarters which they occupied in the preceding year. But when the winter is not particularly severe, they frequently remain through it seeking for shelter among the dams and sluices of the rivers, and returning to their former quarters at the breaking of the frost.

Although naturally one of the most gentle and inoffensive of birds, the large size, and great muscular power of the swan render it a formidable enemy when driven to extremity, and compelled to act on the defensive. In such a case, it is said to give battle to the eagle, and frequently even to repel his attack, forcing him to seek his safety in flight. It never attempts to molest any of the smaller water-fowl that inhabits its domains; but in the season of its amours, it will not suffer a rival to approach its retreat without a sanguinary struggle, in which one or the other is generally destroyed. It is said to attain a very great age, thirty years being commonly spoken of as the term of its existence. It is even asserted that in Alkmar, a town in the north of Holland, there died, in the year 1672, a swan belonging to the municipality, which bore on its collar the date 1573, and must consequently have been a century old

[*] **The Wild Swan**, or, as it is not unfrequently termed, the Hooper, is a native of nearly the whole northern hemisphere. In the Old World, it passes northwards as far as Iceland and Kamtschatka, skirting the borders of the Arctic Circle, but rarely entering within its limits. Those which inhabit Europe, generally pass the winter in its more southern regions, and even extend their flight to Egypt and Barbary; while the Asiatic birds seem rarely to pass much farther south than the shores of the Caspian and Black Seas. In America, the range of their migrations is bound by Hudson's Bay on the north, and Lousiana and the Carolinas on the south. They are extremely abundant in the northern parts of the New Continent and in Siberia; and in many districts of Russia they take the place of that which is improperly termed the Tame species, submitting themselves with equal readiness to the process of domestication.

In habits the Wild Swan bears a close resemblance to the Tame. It flies with so much rapidity, especially when sailing before the wind, that the difficulty of shooting it is very great Hearne asserts that it is "frequently necessary to take a sight ten or twelve feet before their bills;" and adds that "in a brisk gale, they cannot fly at a less rate than a hundred miles an hour, but when flying across the wind or against it, they make but a slow progress, and are then a noble shot." They are much sought after, for their quill feathers and their down. The flesh, according to the author just quoted, is excellent eating, and when roasted, is equal in flavour to young heifer beef, and the cygnets are very delicate. It is possible, that in this instance, the keen appetite of the sportsman may have imparted a relish to his game which it did not intrinsically possess. In Europe it is little sought after, and although young cygnets are occasionally served upon the tables of the great. the rarity of the dish may be supposed to add not a little to its actual flavour, which, to the taste of beef, joins somewhat of that which is common to ducks and most of our water-fowl.

The Wild Swans arrive in Hudson's Bay as early as March. preceding all the other species of water-fowl. While the rivers remain frozen, they frequent the falls and rapids, where they are often shot by the Indians in large numbers. They are also pursued by the natives in moulting time, which takes place in July and August; but it is extremely difficult to catch them, as they run with great swiftness on the surface of the water. In Iceland and Kamtschatka, they are hunted at this time with dogs and horses, and frequently distance the latter, but are eventually pulled down by the dogs. which seize them by the neck and overbalance them. The female usually builds her nest

Such is the extraordinary difference between these two animals, which externally seem to be of one species. Whether it is in the power of long continued captivity and domestication to produce this strange variety, between birds otherwise the same, I will not take upon me to determine. But certain it is, that our tame swan is no where to be found, at least in Europe, in a state of nature.

As it is not easy to account for this difference of conformation, so it is still more difficult to reconcile the accounts of the ancients with the experience of the moderns, concerning the vocal powers of this bird. The tame swan is one of the most silent of all birds; and the wild one has a note extremely loud and disagreeable. It is probable, the convolutions of the wind-pipe may contribute to increase the clangor of it: for such is the harshness of its voice, that the bird from thence has been called the Hooper. In neither is there the smallest degree of melody; nor have they, for above this century, been said to give specimens of the smallest musical abilities: yet, notwithstanding this, it was the general opinion of antiquity, that the swan was a most melodious bird; and that, even to its death, its voice went on improving. It would show no learning to produce what they have said upon the music of the swan: it has already been collected by Aldrovandus; and still more professedly by the Abbe Gedoyn, in the Transactions of the Academy of Belles Lettres. From these accounts it appears that, while Plato, Aristotle, and Diodorus Siculus, believed the vocality of the swan, Pliny and Virgil seem to doubt that received opinion. In this equipoise of authority, Aldrovandus seems to have determined in favour of the Greek philosophers; and the form of the wind-pipe in the wild swan, so much resembling a musical instrument, inclined his belief still more strongly. In aid of this also, came the testimony of Pendasius, who affirmed, that he had often heard swans sweetly singing in the lake of Mantua, as he was rowed up and down in a boat; as also of Olaus Wormius, who professed that many of his friends and scholars had heard them singing.*

Our modern authorities, in favour of the singing of swans, are rather suspicious. It is probable the ancients had some mythological meaning in ascribing melody to the swan; and as for the moderns, they scarce deserve our regard. The swan, therefore, must be content with that share of fame which it possesses on the score of its beauty; since the melody of its voice, without better testimony, will scarcely be admitted by even the credulous.

This beautiful bird is as delicate in its appetites, as elegant in its form. Its chief food is corn, bread, herbs growing in the water, and roots and seeds, which are found near the margin. It prepares a nest in some retired part of the bank, and chiefly where there is an islet in the stream. This is composed of water-plants, long grass and sticks; and the male and female assist in forming it with great assiduity. The swan lays seven or eight eggs, white, much larger than those of a goose, with a hard, and sometimes a tuberous shell. It sits near two months before its young are excluded; which are ash-coloured when they first leave the shell, and for some months after. It is not a little dangerous to approach the old ones, when their little family are feeding round them. Their fears, as well as their pride, seem to take the alarm; and they have sometimes been known to give a blow with their pinion, that has broken a man's leg or arm.

It is not till they are a twelve-month old that the young swans change their colour with their plumage.† All the stages of this bird's approach to maturity

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on an island in the centre of a lake, and lays from five to seven eggs, "so big," says Hearne, "that one of them is sufficient for a moderate man, without bread or any other addition."

* **Dirge.**—Col. Montagu says, "Having killed one of the species out of a flock of ten or twelve, its companions flew round it several times, making a most melancholy cry before they flew off. This puts us in mind of the solemn dirge of the dying swan described by the ancient poets, and may possibly have given rise to those accounts; only by them it is made to be sung by the "dying bird." Byron says

> "Sweet as the swan's last requiem ere she dies."

† **The Black Swan.**—When the classical writers of antiquity spoke of the black swan as a proverbial rarity, so improbable as almost to

are slow, and seem to mark its longevity. It is two months hatching; a year in growing to its proper size; and if, according to Pliny's observation, that those animals that are longest in the womb are the longest lived, the swan is the longest in the shell of any bird we know, and is said to be remarkable for its longevity. Some say that it lives three hundred years; and Willughby, who is in general diffident enough, seems to believe the report. A goose, as he justly observes, has been known to live a hundred; and the swan, from its superior size, and from its harder, firmer flesh, may naturally be supposed to live still longer.

Swans were formerly held in such great esteem in England, that by an act of Edward the Fourth, none, except the son of the king, was permitted to keep a swan, unless possessed of five marks a year. By a subsequent act, the punishment for taking their eggs was imprisonment for a year and a day, and a fine at the king's will.

be deemed impossible, little did they imagine that in these latter days a region would be discovered, nearly equal in extent to the Roman empire even at the proudest period of its greatness, in which their "rara avis" would be found in as great abundance as the common wild swan upon the lakes of Europe. Such, however, has been one of the least singular among the many strange and unexpected results of the discovery of the great southern continent of New Holland. Scarcely a traveller who has visited its shores omits to mention this remarkable bird. An early notice of its transmission to Europe occurs in a letter from Witsen to Dr Martin Lister, printed in the twentieth volume of the Philosophical Transactions; and Valentyn published, in 1726, an account of two living specimens brought to Batavia. Cook, Vancouver, Philip, and White, mention it incidentally in their voyages; and Labillardière, in his Narrative of the Expedition of D Entrecasteux in search of La Pérouse, has given a more particular description, together with a tolerable figure. Another figure, of no great value, has also been given by Dr. Shaw in his Zoological Miscellany.

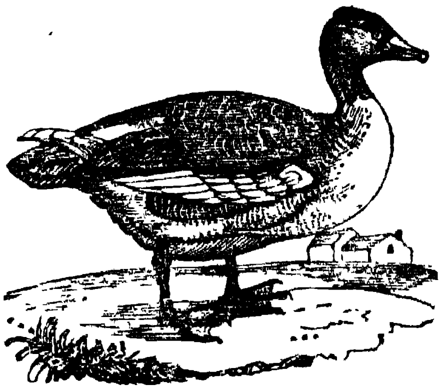
Since this period many living individuals have been brought to England, where they thrive equally well with the emus, the kangaroos, and other Australian animals, insomuch that they can now scarcely be regarded as rarities even in this country. They are precisely similar in form and somewhat inferior in size to the wild and tame swans of the old world; but are perfectly black in every part of their plumage, with the exception of the primary and a few of the secondary quill feathers, which are white. The bill is of a bright red above, and is surmounted at the base in the male by a slight protuberance, which is wanting in the female. Towards its anterior part it is crossed by a whitish band. The under part of the bill is of a greyish white; and the legs and feet are of a dull ash colour. In every other respect, except in the mode of convolution of its trachea, this bird so perfectly corresponds with its well-known congeners, that it is only necessary to refer to any species for an account of the characters which are common to them all.

The black swans are found as well in Van Dieman s Land as in New South Wales, and on the western coast of New Holland. They are generally seen in flocks of eight or nine together, floating on a lake; and when disturbed, flying off like wild geese in a direct line one after the other. They are said to be extremely shy, so as to render it difficult to approach within gunshot of them.

CHAP. XI.

THE GOOSE AND ITS VARIETIES

The Goose, in its domestic state, exhibits a variety of colours. The wild goose always retains the same marks: the whole upper part is ash-coloured; the breast and belly are of a dirty white; the bill is narrow at the base, and at the tip it is black; the legs are of a saffron colour, and the claws black These marks are seldom found in the tame; whose bill is entirely red, and whose legs are entirely brown. The wild goose is rather less than the tame; but both invariably retain a white ring round their tail, which shows that they are both descended from the same original.


(The Goose.)

The wild goose is supposed to breed in the northern parts of Europe; and, in the beginning of winter, to descend into more temperate regions. They are often seen flying at very great heights, in flocks from fifty to a hundred, and seldom resting by day. Their cry is frequently heard when they are at an imperceptible distance above us; and this seems bandied from one to the other, as among hounds in the pursuit. Whether this be the note of mutual encouragement, or the necessary consequence of respiration, is doubtful; but they seldom exert it when they alight in these journeys.

Upon their coming to the ground by day, they range themselves in a line, like cranes: and seem rather to have descended for rest than for other refreshment When they have sat in this manner for an hour or two, I have heard one of them, with a loud, long note, sound a kind of charge, to which the rest punctually attended, and they pursued their journey with renewed alacrity. Their flight is very regularly arranged: they either go in a line abreast, or in two lines, joining in an angle in the middle. I doubt whether the form of their flight be thus arranged to cut the air with greater ease, as is commonly believed; I am more apt to think it is to present a smaller mark to fowlers from below. A bullet might easily reach them, if huddled together in a flock, and the same discharge might destroy several at once; but, by their manner of flying, no shot from below can affect above one of them; and from the height at which they fly, this is not easy to be hit.*

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* **Flight of Geese — Habits.**— Their flight takes place without noise; and the order in which it is performed presupposes no small degree of combination and intelligence. It is an arrangement the most favourable for each individual to follow in its place and preserve its proper rank, and for the entire flock to cut the air with the smallest degree of fatigue. They place themselves in two oblique lines, forming an angle, or in a single line when the troop is not very numerous. He who is at the head of the angle cuts the air first, retires to the last rank to repose himself when fatigued, and the others take his place in their turns. There are certain points, so to speak, from which the grand armies of these birds divide to spread themselves through different countries; such are Mount Taurus, relative to Asia Minor, and Mount Stella, where they repair in the after season, and from whence they disperse through Europe. These secondary bands unite again, and form others which, to the number of four or five hundred, come sometimes in winter and alight upon our fields, where they feed upon the corn and grass, scraping away the snow. Every evening after sunset the wild geese repair to

The Barnacle differs in some respects from both these; being less than either, with a black bill, much shorter than either of the preceding. It is scarce necessary to combat the idle error of this bird's being bred from a shell sticking to ship's bottoms; it is well known to be hatched from an egg, in the ordinary manner, and to differ in very few particulars from all the rest of its kind

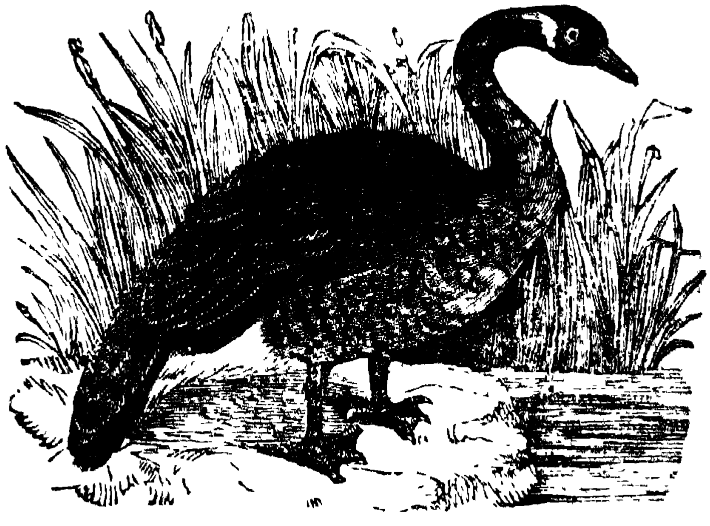
The Brent Goose is still less than the former, and not bigger than a Muscovy duck, except that the body is longer. The head, neck, and upper part of the breast, are black; about the middle of the neck, on each side, are two small spots or lines of white, which together appear like a ring.

These, and many other varieties, are found in this kind, which agree in one common character of feeding upon vegetables, and being remarkable for their fecundity.* Of these, however, the tame goose is the most fruitful. Having

ponds and rivers, where they pass the night, that they may enjoy security. Their habits, in this respect, are very different from those of ducks, which go during the night to pasture in the fields, and do not return to the water but when the geese quit it. It is only during not very severe winters that the wild geese remain any time in temperate climates; for, when the rivers are frozen, they advance more southward, whence they retire towards the end of March to return to the north, and proceed into the most elevated latitudes, to Spitzbergen, Greenland, to the shores of the Frozen Ocean, and to Hudson's Bay, where their fat and dung constitute a resource for the hardy inhabitants. The geese have good sight, very fine hearing, and their vigilance is so great that they are never taken at fault. While they are eating, or sleeping, there is goose chase," sufficiently proves this, and always a sentinel in the troop, who, with his neck stretched out, and head in the air, is ready to give the signal of danger. If we add to these signs of intelligence, and to the remarks already made on the arrangement of their order of flight, the signal proofs of attachment which domestic geese have exhibited on many occasions, we shall perceive how little foundation there is for the popular opinion respecting their stupidity. This, indeed, appears to have been formed merely on external characters; on their walk, their stretched-out neck, gaping mouth, and the sound of their voice, especially when they experience any terror. As these birds fly remarkably high, and do not alight but when they are over waters, there is considerable difficulty in shooting them; and their extreme distrust renders, for the most part, all the stratagems employed by fowlers of no avail. Our common application of the proverb, "a wild goose chase," sufficiently proves this, and ought to do away with the vulgar prejudice respecting their stupidity.

* The Canadian Goose.—The Canadian Goose is somewhat larger than our common domesticated breed. It is also slenderer in its make, and especially in its neck, which consequently approaches nearly to that of the swan. The entire length of the bird is about three feet, and the expanse of its wings rather more than five.

Although commonly known by the name of the Canadian geese, these birds are by no means confined to that country, but extend their migrations from the lowest latitudes of the United States to the highest parallels that have yet been visited in the northern regions of America. Throughout the whole of this vast extent of territory, they are familiarly known as the harbingers of spring when passing northward, and the presage of approaching winter on their return. In the United States it is the popular belief that their journeys are bounded by the great chain of lakes, in the islands of which they are supposed to breed; but even on the shores of Hudson's Bay they are still found to be proceeding northwards, and they rarely nest further south than sixty degrees. Captain Phipps mentions having seen wild geese at Spitsbergen, in more than eighty degrees of


(The Canadian Goose.)

less to fear from its enemies, leading a securer, and more plentiful life, its prolific powers increase in proportion to its ease; and though the wild goose seldom lays above eight eggs, the tame goose is often seen to lay above twenty. The female hatches her eggs with great assiduity; while the gander visits her twice or thrice a day, and sometimes drives her off to take her place, where he sits with great state and composure.

But beyond that of all animals is his pride when the young are excluded: he seems then to consider himself as a champion, not only obliged to defend his young, but also to keep off the suspicion of danger; he pursues dogs and men that never attempt to molest him; and, though the most harmless thing alive, is then the most petulant and provoking. When, in this manner, he has pursued the calf or the mastiff, to whose contempt alone he is indebted for safety, he returns to his female and her brood in triumph, clapping his wings, screaming, and showing all the marks of conscious superiority. It is probable, however, these arts succeed in raising his importance among the tribe where they are displayed; and it is probable there is not a more respectable animal on earth to a goose than a gander!

A young goose is generally reckoned very good eating; yet the feathers of this bird still farther increase its value. I feel my obligations to this animal every word I write; for, however deficient a man's head may be, his pen is nimble enough upon every occasion: it is happy indeed for us that it requires no great effort to put it in motion. But the feathers of this bird are still as valuable in another capacity, as they make the softest and the warmest beds to sleep on.*

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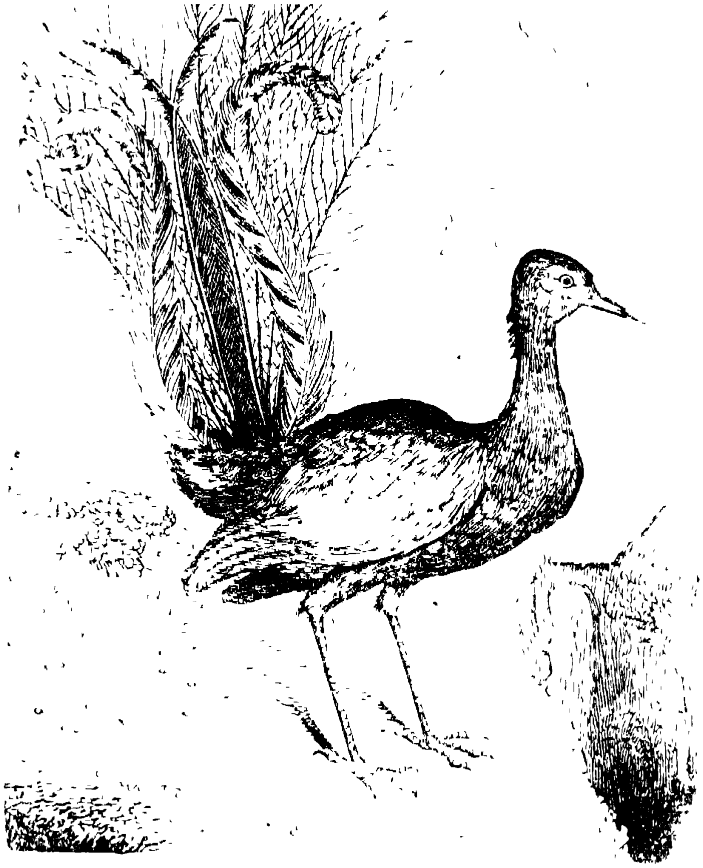
latitude; and Wilson deems it "highly probable that they extend their migrations under the very pole itself, amid the silent desolation of unknown countries, shut out since the creation from the prying eye of man by everlasting and insuperable bars of ice."

The passage of the geese to the north commences with the breaking up of the ice; their first appearance in Canada and on the shores of Hudson's Bay varying with the forwardness of spring, from the middle of April to the latter end of May. Their flight is heavy and laborious, but moderately swift, in a straight line when the numbers are few, but more frequently in two lines meeting in a point in front. The van is said to be always led by an old gander, in whose wake the others instinctively follow. But should his sagacity fail in discovering the landmarks by which they usually steer, as sometimes happens in foggy weather, the whole flock appear in the greatest distress, and fly about in an irregular manner, making a great clamour. In their flights they cross indiscriminately over land or water, differing in this respect from several other geese, which prefer making a circuit by water to traversing the land.

So important is the arrival of the geese to the inhabitants of these northern regions, that the month in which they first make their appearance is termed by the Indians, as Pennant informs us, the Goose Moon. In fact, not only the Indians, but the English settlers, also, depend greatly upon these birds for their subsistence; and many thousands of them are annually killed, a large proportion of which are salted and barrelled for winter consumption. Many, too, that are killed on their return are suffered to freeze, and are thus kept as fresh provision for several months.

* EGYPTIAN GEESE.—In the course of last February, a flock of these rare birds denominated gansers, or Egyptian geese (*Anas Ægyptiaca*, Linn.), were seen to visit the Tweed at Carham; two of which were shot, while nibbling grass on the margin of the river, by Ralph Stephenson, gamekeeper. These two, upon examination, were found to bear all the beautiful variegated marks which distinguish the species, more especially the broad, deep, chestnut-coloured spot on the middle of the breast. This beautiful bird, which was first known in our island about a century ago, is of nearly the size of the common wild goose. It is a native of Africa, where it is found in a wild state from Egypt to the Cape of Good Hope. It is now found in several European countries, and frequently kept as an ornament on pieces of water contiguous to gentlemen's seats. One of the birds shot at Carham has been sent to Edinburgh; the other is in the hands of an ingenious person of the name of Hood, in Coldstream, for the purpose of being stuffed.

OBESITY.—The celebrated fat liver pies of Strasburgh are made of the livers of geese, fattened with great attention. The animal is shut up in a cage, but little larger than its body, and is taken out but twice a-day, and then to be fed with about a quart of crude peas. They are introduced with a finger into the pharynx of the animal, which is thus



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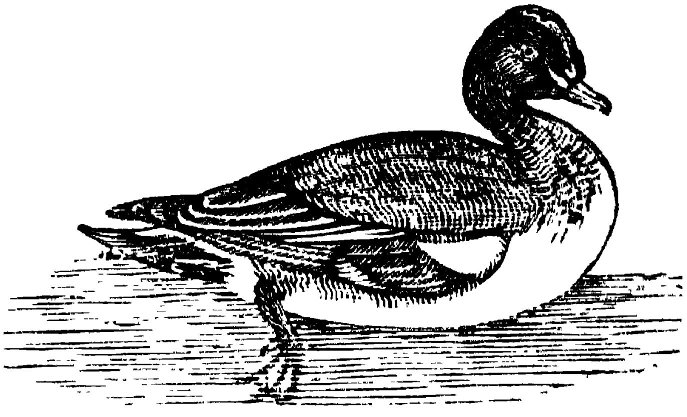
CHAP. XII.

THE DUCK AND ITS VARIETIES.



(The Tame Duck.)

The Tame Duck is the most easily reared of all our domestic animals. The very instincts of the young ones direct them to their favourite element; and though they are conducted by a hen, yet they despise the admonitions of their leader.

The wild duck differs in many respects from the tame; and in them there is still greater variety than among the domestic kinds. Of the tame duck there are not less than ten different sorts; and of the wild, Brisson reckons above twenty. The most obvious distinction between wild and tame ducks is in the colour of their feet; those of the tame duck being black, those of the wild duck yellow. The difference between wild ducks among each other arises as well from their size as the nature of the place they feed in. Sea ducks, which feed in the salt water, and dive much, have a broad bill, bending upwards, a large hind toe, and a long, blunt tail. Pond ducks, which feed in plashes, have a straight and narrow bill, a small hind toe, and a sharp-pointed train. The former are called, by our decoy men, foreign ducks; the latter are supposed to be natives of England. It would be tedious to enter into the minute varieties of such a number of birds; all agreeing in the same general figure, the same habits and mode of living, and differing in little more than their size and the colours of their plumage. In this tribe we may rank, as natives of our own European dominions, the Eider Duck, which is double the size of a common duck, with a black bill; the Velvet Duck, not so large, and with a yellow bill; the Scoter, with a knob at the base of a yellow bill; the Tufted Duck, adorned with a thick crest; the Scaup Duck, less than the

(The Eider Duck.)

made to swallow this enormous quantity of nourishment, and is then immediately shut up in its cage. The immediate result of this kind of life is a remarkable obesity, and an enormous developement of the liver, which, without any notable change of structure, acquired a triple or quadruple enlargement of volume. Bibulous paper, brought into close contact with this fat liver, immediately absorbs an oily matter, much like melted fat. These livers sometimes weigh eight or ten ounces, and sell at from three to five francs. The fattening of geese in this manner is a good speculation, for every part of the animal possesses an intrinsic value; the fat on many occasions is a substitute for butter, and the flesh is served at table, and although somewhat tough, is not the less nutritious; the feathers are much sought after, the quills serve for writing, and even the excrements sell at a high price as one of the richest of manures.—Arcana of Science, 1833.

common duck, with the bill of a greyish-blue colour; the Golden Eye, with a large white spot at the corners of the mouth, resembling an eye; the Sheldrake, with the bill of a bright red, and swelling into a knob; the Mallard, which is the stock from whence our tame breed has probably been produced; the Pintail, with the two middle feathers of the tail three inches longer than the rest; the Pochard, with the head and neck of a bright bay; the Widgeon, with a lead-coloured bill, and the plumage of the back marked with narrow black and white undulated lines, but best known by its whistling sound: lastly, the Teal, which is the smallest of this kind, with the bill black, the head and upper part of the neck of a bright bay. These are the most common birds of the duck kind among ourselves; but who can describe the amazing variety of this tribe, if he extends his view to the different quarters of the world? The most noted of the foreign tribe are the Muscovy Duck, or, more properly speaking, the Musk Duck, so called from a supposed musky smell, with naked skin round their eyes, and which is a native of Africa; the Brazilian Duck, that is of the size of a goose, all over black except the tips of the wings. The American Wood Duck, with a variety of beautiful colours, and a plume of feathers that falls from the back of the head like a friar's cowl. These, and twenty others might be added, were increasing the number of names the way to enlarge the sphere of our comprehension.

All these live in the manner of our domestic ducks, keeping together in flocks in the winter, and flying in pairs in summer, bringing up their young by the water side, and leading them to their food as soon as out of the shell. Their nests are usually built among heath or rushes, not far from the water; and they lay twelve, fourteen, or more eggs before they sit: yet this is not always their method; the dangers they continually encounter from their ground situation sometimes obliges them to change their manner of building, and their awkward nests are often seen exalted on the tops of trees.* This must be a very great

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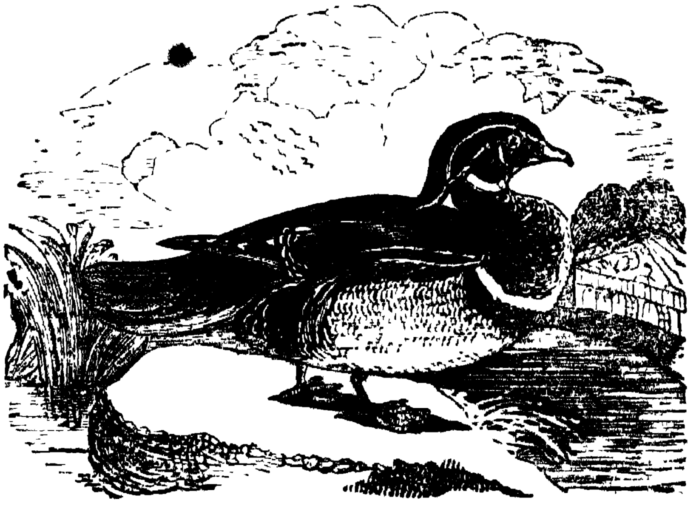
* Nests of Ducks. — It has been remarked by Aristotle, that birds which do not perch build on the ground. "Partridges," he says, "and other birds which seldom fly, nestle on the ground; of these, also, the skylark, the woodcock, and the quail, never alight on a tree." But the converse of this will not hold; for many birds which perch nestle on the ground, of which the redbreast, the bunting, and the pheasant, are familiar illustrations. A very remarkable example, however, of the remark of Aristotle, occurs in the summer-duck of America, which does not seem out of place to be mentioned here, as one of the birds which line their nests with their own down. At variance with the habits of all other ducks, this one perches on trees, for which its strong, sharp claws render it more adapted than its webbed feet. The elegant form and rich colouring of the male (though the female wears a uniform of dull brown) have excited the admiration of all who have seen it; and we think it not at all unlikely that the Indians took the hint of their plumed head-dresses from its beautiful crest. With this crest, and the skin of the neck, the calumet, or pipe of peace, is frequently ornamented. Linnæus, whose nomenclature exhibits some general displays of fanciful allusion, imagined that this duck's crest so much resembled the bridal head-dress of his countrywomen, that he named it the bride, though the one is high, stiff, and fantastic, and out of all reasonable proportion, while the other is free, elegant, and graceful. The beautiful pendent crest of the summer-duck arises from a base of glossy golden green, shading off into a


(The Summer-duck.)

labour to perform, as the duck's bill is but ill formed for building a nest, and giving the materials of which it is composed a sufficient stability to stand the weather. The nest, whether high or low, is generally composed of singular materials. The longest grass, mixed with heath, and lined within with the bird's own feathers, usually go to the composition: however, in proportion as the climate is colder, the nest is more artificially made, and more warmly lined. In the arctic regions, nothing can exceed the great care all of this kind take to protect their eggs from the intenseness of the weather. While the gull and the penguin kind seem to disregard the severest cold, the duck, in those regions, forms itself a hole to lay in, shelters the approach, lines it with a layer of long grass and clay, within that another of moss, and, lastly, a warm coat of feathers or down: the eider duck is particularly remarkable for the warmth of its nest.*

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rich violet brown, dashed with interrupted streaks of snow-white. The feathers covering the wings are of the same glossy brown, which melts into black, with rich purple reflections of burnished steel; while those on the flanks are delicately fringed and striped with black and white.

It is stated in the notes to Buffon, by the English translator, that the summer-duck nestles in the holes bored by woodpeckers; but this, on considering its size, must be impossible. That it does, however, make its nest in the holes of trees has been testified by every observer. Wilson informs us that instances have been known in which the nest was constructed with a few sticks laid on the fork of the branches; though it is usually in the inside of a hollow tree, and, as it would appear, very near if not upon the ground. "On the 18th of May," continues Wilson, "I visited a tree containing a nest of a summer-duck, on the banks of Tuckahoe river, New Jersey. It was an old, grotesque, white oak, whose top had been torn off by a storm. It stood on the declivity of a bank, about twenty yards from the water. In this hollow and broken top, and about six feet down, on the soft decayed wood, lay thirteen eggs, snugly covered with down, doubtless taken from the breast of the bird. The tree had been occupied, probably by the same pair, for four successive years in breeding-time. The person who gave me the information, and whose house was within twenty or thirty yards of the tree, said that he had seen the female, the preceding spring, carry down her young ones one by one in less than ten minutes. She caught them in her bill by the wing or back of the neck, and landed them safely at the foot of the tree, whence she afterwards led them to the water. Under this same tree, at the time I visited it, a large sloop lay on the stocks nearly finished; the deck was not more than twelve feet distant from the nest, yet, notwithstanding the presence and noise of the workmen, the ducks would not abandon their old breeding-place, but continued to pass out and in as if no person had been near. The male usually perched on an adjoining limb, and kept watch while the female was laying. A tame goose had chosen a hollow space at the root of the same tree to lay and hatch her young in."—AMERICAN ORNITHOLOGY.

* THE EIDER DUCK.—The eiders have some analogy with the geese, but more with the duck. They live on fish and shell-fish. The eider duck is principally found in the western islands of Scotland, and on the coasts of Norway, Iceland, and Greenland. Its bill is black, and its plumage is a varied mixture of black and white;—the female, however, is of a reddish-brown colour, marked with black and dusky streaks. They generally build on small islands, not far from the shore, and the male continues on the watch near the shore while the female is sitting, but he leaves them when the brood is hatched.

That which renders this bird so highly valued, is the celebrated eider down, used for the beds and couches of the luxurious and effeminate. This is plucked from the breast by the birds, in order to line their nests; and during the time when the female is sitting, those who are concerned in the traffic remove her, and take away the down and superfluous eggs, and then carefully replace her. This is done several times, and the down is again produced by the birds, and she begins to lay afresh; and when the young ones leave the nest, it is completely plundered. One female will give about half a pound of down, which, when properly cleaned, is reduced to one-half of that quantity. This sells at twelve shillings per pound.

The example of the eider duck, in plucking the down from her body in order to keep her offspring warm, is not unmatched in the animal world. The domestic rabbit is a familiar example, preparing for her delicate young a nest of hay, warmly lined with down plucked from her own fur. It may not be so generally known, that several moths, such as the gipsy and the golden tail, are provided with a thick bunch of down on their tails for covering their eggs at the time of laying, and also with a pair of tweezers, likewise situated in the tail, for plucking off this down and spreading it over the eggs.

This bird, which, as was said, is above twice as large as the common duck, and resides in the colder climates, lays from six to eight eggs, making her nest among the rocks or the plants along the sea-shore. The external materials of the nest are such as are in common with the rest of the kind: but the inside lining, on which the eggs are immediately deposited, is at once the softest, warmest, and the lightest substance with which we are acquainted. This is no other than the inside down which covers the breast of the bird in the breeding season. This the female plucks off with her bill, and furnishes the inside of her nest with a tapestry more valuable than the most skilful artists can produce. The natives watch the place where she begins to build, and suffering her to lay, take away both the eggs and the nest. The duck, however, not discouraged by the first disappointment, builds and lays in the same place a second time; and this they in the same manner take away: the third time she builds, but the drake must supply the down from his breast to line the nest with; and, if this be robbed, they both forsake the place, and breed there no more. This down the natives take care to separate from the dirt and moss with which it is mixed; and, though no people stand in more need of a warm covering than themselves, yet their necessities compel them to sell it to the more indolent and luxurious inhabitants of the south for brandy and tobacco.

As they possess the faculties of flying and swimming, so they are in general birds of passage, and it is most probable perform their journeys across the ocean as well on the water as in the air. Those that migrate to this country, on the approach of winter, are seldom found so well tasted or so fat as the fowls that continue with us the year round: their flesh is often lean, and still oftener fishy; which flavour it has probably contracted in the journey, as their food in the lakes of Lapland, from whence they descend, is generally of the insect kind.

As soon as they arrive among us, they are generally seen flying in flocks to make a survey of those lakes where they intend to take up their residence for the winter.* In the choice of these they have two objects in view; to be near their food, and yet remote from interruption. Their chief aim is to choose some lake in the neighbourhood of a marsh, where there is at the same time a cover of woods, and where insects are found in greatest abundance. Lakes, therefore, with a marsh on one side and a wood on the other, are seldom without vast quantities of wild-fowl; and where a couple are seen at any time, that is a sufficient inducement to bring hundreds of others. The ducks flying in the air are often lured down from their heights by the loud voice of the mallard from below. Nature seems to have furnished this bird with very particular faculties for calling. The windpipe, where it begins to enter the lungs, opens into a kind of bony cavity, where the sound is reflected as in a musical instrument, and is heard a great way off. To this call all the stragglers resort; and in a week or fortnight's time, a lake that before was quite naked is black with water-fowl, that have left their Lapland retreats to keep company with our ducks who never stirred from home.

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* Wild Ducks.—It is towards the middle of October that the wild ducks generally begin to make their appearance among us, but only in small bands, which are in a little time followed by others more numerous. They are recognised by their elevated flight, in inclined lines, or regular triangles. They are observed on their arrival to fly incessantly from one pond and river to others. Their movements are made more by night than by day. They feed, voyage, arrive, and depart, principally in the evening, and even at night, during which the whizzing of their flight discovers their passage; but the noise of their wings is greatest at the moment of their setting out. As long as the rigour of the season does not deprive them of aquatic insects, of small fish, of frogs, the grains of seeds, and other marshy plants, which furnish them with abundant food, they remain in rivers and large pieces of stagnant water; but, when these are frozen, they retire to the borders of woods to pick up the acorns, or spread themselves into more temperate climates.

The female usually makes choice of a thick tuft of rushes, of the middle of which she forms a nest by cutting and bending the stems. Such nests are, however, sometimes found in the midst of brushwood, at some distance from the water; and these birds have been known even to lay in the nests of others. The eggs are from ten to fifteen, and sometimes as many as eighteen in number, and of a greenish white. The mother strips her breast to furnish the nest and to cover her eggs in her absence. She never alights at less than a hundred paces from the nest, and makes a circuitous route to arrive there, with her eyes constantly watching to see if there are any enemies in the neighbourhood. Once fixed, however, on the eggs, even the approach of man will not oblige her to quit them. The male remains at some distance from his companion, ready to assist and defend her. The incubation lasts thirty days; and, as soon as the young are disclosed, the mother conducts them to the water: it is even said that, if they are at some distance from it, the parents bring them there one by one with their bills. The female rallies them in the evening, conceals them in the reeds, and covers them with her wings during the night. The small insects, &c., which they can catch on the surface of the water, are their first food. They are unable to fly until they are three months old.

They generally choose that part of the lake where they are inaccessible to the approach of the fowler, in which they all appear huddled together, extremely busy and very loud. What it is can employ them all the day is not easy to guess. There is no food for them at the place they sit and cabal thus, as they choose the middle of the lake; and as for courtship, the season for that is not yet come; so that it is wonderful what can so busily keep them occupied. Not one of them seems a moment at rest. Now pursuing one another, now screaming, then all up at once, then down again; the whole seems one strange scene of bustle with nothing to do.

They frequently go off in a more private manner by night to feed in the adjacent meadows and ditches, which they dare not venture to approach by day. In these nocturnal adventures they are often taken; for, though a timorous bird, yet they are easily deceived, and every springe seems to succeed in taking them. But the greatest quantities are taken in decoys; which, though well known near London, are yet untried in the remoter parts of the country. The manner of making and managing a decoy is as follows.

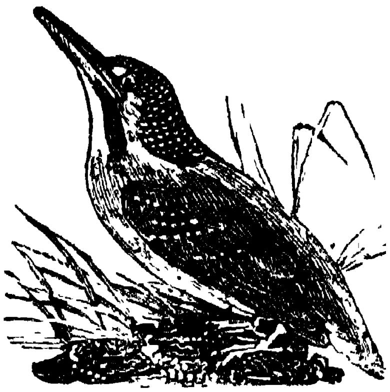
A place is to be chosen for this purpose far remote from the common highway and all noise of people. A decoy is best where there is a large pond surrounded by a wood, and beyond that a marshy and uncultivated country. When the place is chosen, the pool, if possible, is to be planted round with willows, unless a wood answers the purpose of shading it on every side. On the south and north side of this pool are two, three, or four ditches or channels, made broad towards the pool, and growing narrower till they end in a point. These channels are to be covered over with nets, supported by hooped sticks bending from one side to the other; so that they form a vault or arch growing narrower and narrower to the point, where it is terminated by a tunnel-net, like that in which fish are caught in weirs. Along the banks of these channels so netted over, which are called pipes, many hedges are made of reeds slanting to the edge of the channel, the acute angles to the side next the pool. The whole apparatus, also, is to be hidden from the pool by a hedge of reeds along the margin, behind which the fowler manages his operations. The place being fitted in this manner, the fowler is to provide himself with a number of wild ducks made tame, which are called decoys. These are always to be fed at the mouth or entrance of the pipe, and to be accustomed to come at a whistle.

As soon as the evening is set in, *the decoy rises*, as they term it, and the wild fowl feed during the night. If the evening be still, the noise of their wings during their flight is heard at a very great distance, and produces no unpleasing sensation. The fowler, when he finds a fit opportunity, and sees his decoy covered with fowl, walks about the pool, and observes into what pipe the birds gathered in the pool may be enticed or driven. Then casting hemp-seed, or some such seed as will float on the surface of the water, at the entrance and up along the pipe, he whistles to his decoy ducks, who instantly obey the summons, and come to the entrance of the pipe, in hopes of being fed as usual. Thither, also, they are followed by a whole flock of wild ones, who little suspect the danger preparing against them. Their sense of smelling, however, is very exquisite; and they would soon discover their enemy, but that the fowler always keeps a piece of turf burning at his nose, against which he breathes; and this prevents the effluvia of his person from reaching their exquisite senses. The wild ducks, therefore, pursuing the decoy ducks, are led into the broad mouth of the channel or pipe, nor have the least suspicion of the man, who keeps hidden behind one of the hedges. When they have got up the pipe, however, finding it grow more and more narrow, they begin to suspect danger and would return back; but they are now prevented by the man, who shows himself at the broad end below. Thither, therefore, they dare not return; and rise they may not, as they are kept by the net above from ascending. The only way left them, therefore, is the narrow-funnelled net at the bottom; into this they fly, and there they are taken.

To this manner of taking wild fowl in England, I will subjoin another still more extraordinary, frequently practised in China. Whenever the fowler sees a number of ducks settled in any particular plash of water, he sends off two or three gourds to float among them. These gourds resemble our pompions; but being made hollow, they swim on the surface of the water; and on one pool there may sometimes be seen twenty or thirty of these gourds floating together. The fowl at first are a little shy of coming near them, but by degrees they come nearer; and as all birds at last grow familiar with a scarecrow, the ducks gather about these, and amuse themselves by whetting their bills against them. When the birds are as familiar with the gourds as the fowler could wish, he then prepares to deceive them in good earnest. He hollows out one of these gourds large enough to put his head in; and, making holes to breathe and see through, he claps it on his head. Thus accoutred, he wades slowly into the water, keeping his body under, and nothing but his head in the gourd above the surface; and in that manner moves imperceptibly towards the fowls, who suspect no danger. At last, however, he fairly gets in among them; while they, having been long used to see gourds, take not the least fright while the enemy is in the very midst of them: and an insidious enemy he is; for ever as he approaches a fowl, he seizes it by the legs, and draws it in a jerk under water. There he fastens it under his girdle, and goes to the next, till he has thus loaded himself with as many as he can carry away. When he has got his quantity, without ever attempting to disturb the rest of the fowls on the pool, he slowly moves off again; and in this manner pays the flock three or four visits in a day. Of all the various artifices for catching fowl, this seems likely to be attended with the greatest success, as it is the most practised in China.

CHAP. XIII.

THE KING-FISHER.


(The King-fisher.)

I will conclude this history of birds with one that seems to unite in itself some of every class preceding. It seems at once possessed of appetites for prey like the rapacious kinds, with an attachment to water like the birds of that element. It exhibits in its form the beautiful plumage of the peacock, the shadings of the humming-bird, the bill of the crane, and the short legs of the swallow. The bird I mean is the King-fisher, of which many extraordinary falsehoods have been propagated; and yet of which many extraordinary things remain to be said that are actually true.*

The king-fisher is not much larger than a swallow; its shape is clumsy; the legs disproportionably small, and the bill disproportionably long—it is two inches from the base to the tip; the upper chap black, and the lower yellow; but the colours of this bird atone for its inelegant form; the crown of the head and the coverts of the wings are of a deep blackish green, spotted with bright azure; the back and tail are of the most resplendent azure; the whole underside of the body is orange-coloured; a broad mark of the same passes from the bill beyond the eyes; beyond that is a large white spot; the tail is short, and consists of twelve feathers, of a rich deep blue; the feet are of a reddish yellow, and the three joints of the outmost toe adhere to the middle toe, while the inner toe adheres only by one.

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* The King-fisher.—Every schoolboy is acquainted with the story in Ovid's Metamorphoses of Ceyx, king of Magnesia, being shipwrecked, and of his queen, Alcyone, (fabled to be the daughter of the wind,) who flung herself from a cliff overhanging the sea that she might be drowned as well as her husband; but instead of perishing, both were changed into king-fishers: as Dryden gives it:—

> "The gods their shape to winter-birds translate,
> But both obnoxious to their former fate,
> Their conjugal affection first is tried,
> And still the mournful race is multiplied."

Its Singing.—With respect to the vocal powers of any species of halcyon, it is probable that Pliny, and those he copied from, confounded it with the sedge-bird, with the dipper, or some other water songster, whose manner it is to sing concealed; while the halcyon, perched on some leafless twig overhanging the water, being easily perceived, acquired credit for what she was incapable of performing. It was supposed by Belon, and perhaps correctly, that the musical halcyon was the river nightingale, or reed-thrush, which is reported to be a pertinacious songster, and creeps about among water-plants in pursuit of insects; but Belon is wrong in supposing it to be the only river-bird that sings.

The Belted King-fisher.—Wilson's description of the belted king-fisher, though differing in a few points from the common halcyon of Europe, comes much nearer the reality than the fables of the old poets and naturalists. "Like the love-lorn swains," he says, "of whom poets tell us, he delights in murmuring streams and falling waters; not, however, merely, that they may soothe his ear, but for a gratification more substantial. Amidst the roar of the cataract, or over the foam of the torrent, he sits perched upon an overhanging bough, glancing his piercing eye in every direction below for his scaly prey, which, with a sudden, circular plunge, he sweeps up from their native element and swallows in an instant. His voice, which is not unlike the twirling of a watchman's rattle, is naturally loud, harsh, and sudden; but is softened by the sound of the brawling streams and cascades among which he generally rambles. He courses along the windings of the brook or river at a small height above the surface, sometimes suspending himself by the rapid action of his wings, like certain species of hawks, ready to pounce on the fry below; now and then settling on an old, dead, overhanging limb to reconnoitre. Mill-dams are particularly visited by the feathered fisher; and the sound of his pipe is as well known to the miller as the rattling of his own hopper.—American Ornithology.

From the diminutive size, the slender, short legs, and the beautiful colours of this bird, no person would be led to suppose it one of the most rapacious little animals that skims the deep. Yet it is for ever on the wing, and feeds on fish, which it takes in surprising quantities, when we consider its size and figure. It chiefly frequents the banks of rivers, and takes its prey after the manner of the osprey, balancing itself at a certain distance above the water for a considerable space, then darting into the deep, and seizing the fish with inevitable certainty. While it remains suspended in the air, in a bright day, the plumage exhibits a beautiful variety of the most dazzling and brilliant colours. It might have been this extraordinary beauty that has given rise to fable; for, wherever there is anything uncommon, fancy is always willing to increase the wonder.

Of this bird it has been said that she built her nest on the water, and thus in a few days hatched and produced her young. But, to be uninterrupted in this task, she was said to be possessed of a charm to allay the fury of the waves; and during this period the mariner might sail with the greatest security.

A hundred instances might be given of the credulity of mankind with respect to this bird. They entered into speculations concerning the manner of her calming the deep, the formation of her nest, and her peculiar sagacity; at present we do not speculate, because we know, with respect to our king-fisher, that most of the facts are false. It may be alleged, indeed, with some show of reason, that the halcyon of the ancients was a different bird from our king fisher; it may be urged that many birds, especially on the Indian Ocean, build a floating nest upon the sea; but still the history of the ancient halcyon is clogged with endless fable; and it is but an indifferent method to vindicate falsehood by showing that a part of the story is true.*

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* SUPERSTITIONS.—It may be interesting, as a sequel to the fancies of the ancients, to mention one or two modern superstitions respecting the king-fisher. "I have once or twice," says Mrs. Charlotte Smith, "seen a stuffed bird of this species, hung up to the beam of a cottage ceiling, and imagined that the beauty of the feathers had recommended it to this sad pre-eminence, till, on inquiry, I was assured that it served the purpose of a weather-vane; and though sheltered from the immediate influence of the wind, never failed to show every change, by turning its beak to the quarter from whence the wind blew."

This was an old superstition, for Shakspeare, speaking of sycophants, says, they

"Turn their halcyon beaks
With every gale and vary of their masters."

The learned, but somewhat credulous author of the "Physicae Curiosae," asserts the same upon the testimony of his own observation. "Father Athanasius Kircher," he says, "had one of these birds sent him in a present by a friend, and being disembowelled and dried, it was suspended from the ceiling of his celebrated museum, from 1640 to 1655, when I left Rome; and though all the windows were shut, it constantly turned its bill towards the wind; and this I myself observed with admiration and pleasure, almost every day, for the space of three years." It would be useless to follow the author in the fanciful philosophy by which he pretends, after Kircher, to account for the phenomenon; for, notwithstanding his personal testimony, the whole story is no less fabulous than the tradition of the dried body of the same bird having the property of preserving cloth and woollen stuffs from the moth, which once induced drapers to hang it up in their shops. But this is nothing to the pretended power of the lifeless skin of averting thunder, augmenting hidden treasure, bestowing grace and beauty on the person who carries it, and renewing its plumage each season of moulting.

Gmelin tells us that the Tartars pluck the feathers from a king-fisher, "cast them into the water, and carefully preserve such as float, pretending that, if with one of these feathers they touch a woman, or even her clothes, she must fall in love with them. The Asiatics take the skin, the bill, and the claws of this bird, shutting them up in a purse; and so long as they preserve this sort of amulet, they believe they have no ill to fear. The person who taught me this means of

The king-fisher with which we are acquainted at present has none of those powers of allaying the storm, or of building upon the waves; it is contented to make its nest on the banks of rivers, in such situations as are not to be affected by the rising of the stream. When it has found a place for its purpose, it hollows out with its bill a hole about a yard deep; or if it finds the deserted hole of a rat, or one caused by the root of a tree decaying, it takes quiet possession. This hole it enlarges at the bottom to a good size; and, lining it with the down of the willow, lays its eggs there without any further preparation. Its nest, or rather hole, is very different from that described by the ancients, by whom it is said to be made in the shape of a long-necked gourd of the bones of the sea-needle. The bones, indeed, are found there in great quantities, as well as the scales of fishes; but these are the remains of the bird's food, and by no means brought there for the purposes of warmth or convenience. The king-fisher, as Bellonious says, feeds upon fish, but is incapable of digesting the bones and scales, which he throws up again as eagles and owls are seen to do a part of their prey. These fill the bird's nest, of course; and although they seem as if designedly placed there, are only a kind of nuisance.*

living happy could not forbear shedding tears while he told me that the loss of a king-fisher's skin had caused him to lose both his wife and his goods."—TRAVELS.

HABITS.—"Our own opportunities," says Mr. Rennie, "of carefully studying the habits of this bird, lead us to remark, that it is not so very shy and solitary as it has been represented, for it has more than once allowed us to approach it, within a few yards of the bough on which it was perched." Mr. Jennings says that it is "rarely if ever found near the habitations of man." On the contrary, we are in the habit of seeing king-fishers very often on the banks of a brook which runs past our garden, not a hundred yards from the house. A king-fisher's nest was found with young last summer on the banks of the same brook, (at Lee, in Kent), and within gun-shot of a whole row of houses. This fact was stated in the Magazine of Natural History. Another correspondent of Mr. Loudon's says, "that for the last nine years, and perhaps more, I have observed that a pair of king fishers have uniformly constructed their nest in a hole of a bank which projects over a piece of water, on my premises, not a hundred yards from my house." In the summer of 1828, a single king-fisher took up his abode at Stamford Hill, in the immediate neighbourhood of London, in a narrow garden, much frequented, and close to several houses, on occasion of a small pond being stocked with gold fish. The bird was frequently seen perched upon an ornament in the middle of the pond, watching the fish, and was at last shot by the gardener, from an apprehension that he would destroy the young fry. The necessity for obtaining its food from streams and shallow ponds causes this bird, however, to frequent secluded places. The belted king-fisher, as we have seen, is partial to mill-dams, in defiance of the clack of the hopper, because there he finds facilities in watching for fish.

* HALCYONS' NESTS.—It is easy to be perceived how the king-fisher might be mistaken for a bird of song. But the fancy of the halcyon's ruling the weather after the manner assumed by the philosopher in the tale of Rasselas is so extravagant, that we cannot but smile at Montaigne, who seriously believes that "nature has honoured no other animal so much during its sitting and disclosing, for that the whole ocean is stayed, made stable, and smoothed, without waves, with wind or rain, whilst the halcyon broods upon her young, which is just about the winter solstice—so that, by her privilege, we have seven days and seven nights, wherein we may sail without danger."

Montaigne is equally undoubting in his faith as to the wonderful construction of the halcyon's nest. "The most inquisitive into the secrets of nature could never yet arrive at the knowledge of the wonderful fabric and architecture wherewith the halcyon builds her nest for her little ones, nor guess at the matter. Plutarch, who has seen and handled many of them, thinks it is the bones of some fish which, with her beak and no other instrument, she joins and bends together, interlacing them, some lengthwise and others across, and adding ribs and hoops in such a manner, that she forms at last a round vessel fit to launch—which being done, and the building finished, she carries it to the edge of the sea-beach, where the waves, beating gently against it, shows her where to mend what is not well joined and knit, and where, better to fortify the seams that are leaky and open at the beating of the waves; and, on the contrary, what is well built and has had due finishing, the beating of the waves does so close and bind together, that it is not to be broken or cracked, by blows either of stone or iron, without a great deal of trouble."

In these holes, which, from the remains of fish brought there, are very fœtid, the King fisher is often found with from five eggs to nine. There the female continues to batch even though disturbed; and though the nest be robbed, she will again return and lay there.

The female begins to lay early in the season, and excludes her first brood about the beginning of April. The male, whose fidelity exceeds even that of the turtle, brings her large provisions of fish while she is thus employed; and she, contrary to most other birds, is found plump and fat at that season. The male, that used to twitter before this, now enters the nest as quietly and as privately as possible. The young ones are hatched at the expiration of twenty days; but are seen to differ as well in their size as in their beauty.*

Having thus given a short history of birds, I own I cannot take leave of this most beautiful part of the creation without reluctance. These splendid inhabitants of air possess all those qualities that can soothe the heart and cheer the fancy. The brightest colours, the roundest forms, the most active manners, and the sweetest music. In sending the imagination in pursuit of these, in following them to the chirruping grove, the screaming precipice, or the glassy deep, the mind naturally lost the sense of its own situation, and, attentive to their little sports, almost forgot the TASK of describing them. Innocently to amuse the

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"To us," says Mr. Rennie, "it appears that what Plutarch took for the nest of the halcyon was simply the crustaceous covering of some of the sea-urchins (*Echinidæ*), which agree in most particulars with his description. The most common of the shells, perhaps, is the edible one found on sea rocks, near low-water mark, and varying in size from that of a small orange to nearly that of a cocoa-nut, and in colour from almost white to reddish orange.

ARCHITECTURE OF BIRDS.

Up to the present time, more or less misrepresentation has been introduced into the description of its burrow. Gesner furnishes it with a soft bed of reed-flowers; Goldsmith says it lines its hole with the down of the willow; and Colonel Montagu, half reverting to the ball of fish-bones described by Aristotle, tells us that at the end of the hole there is a kind of bedding, formed of the bones of small fish and some other substances, evidently the castings of the parent birds. From Montagu's high authority, his description is copied as authentic from every modern author. Mr. Rennie contradicts the inference. "In the bank of a stream at Lee," says that gentleman, "we have been acquainted with one of these nests in the same hole for several successive summers; but so far from the pellets of fish bone ejected as is done by all birds of prey, being dried on purpose to form the nest, they are scattered about the floor of the hole in every direction. That the eggs may by accident be laid upon portions of these fish bones is highly probable, for the floor is so thickly strewed with them, that no vacant spot might be found; but they assuredly are not by design built into a nest."—MONTAGU'S ORNITHOLOGICAL DICTIONARY.

* A SPECIES OF ALCEDO, OR KING-FISHER.

—There is another bird in this country which has often excited my surprise and curiosity, and which, I believe, is peculiar to this place. Every day are to be seen numerous flocks of birds, not quite so large as pigeons, with dark backs and white bellies, passing up and down the Bosphorus with great rapidity. When they arrive either at the Black Sea, or the Sea of Marmora, they again wheel about, and return up the channel; and this course they continue, without a moment's intermission, the whole of the day. They are never seen to alight, either on land or water; they never for a moment deviate from their course, or slack their speed; they are never known to search for or take any food; and no visible cause can be assigned for the extraordinary and restless instinct by which they are haunted. The French call them *les ames damneés;* and certainly, if being allowed no cessation or repose be included in the idea, it is not misapplied. They fly very near the surface of the water; and, if a boat meets a flock of them transversely, they rise a few feet over it; if directly, it divides them like a wedge. Their flight is remarkably silent; and though so numerous and so close, the whirr of their wings is scarcely ever heard. They are so abundant in this particular spot, that I have reckoned fifteen large flocks in my passage from Pera to Therapia. I have often wished to shoot one, to examine it; but the Turks have such a tender and conscientious regard for the life of every animal but man, that no person is permitted to kill any bird upon the Bosphorus, without incurring their displeasure. The only work in which I have seen it mentioned is *Andreossis sur le Bosphore.* He calls it Alcyon voyageur, to distinguish it from the halcyon of the ancients, which was supposed to build its nest upon the waters.

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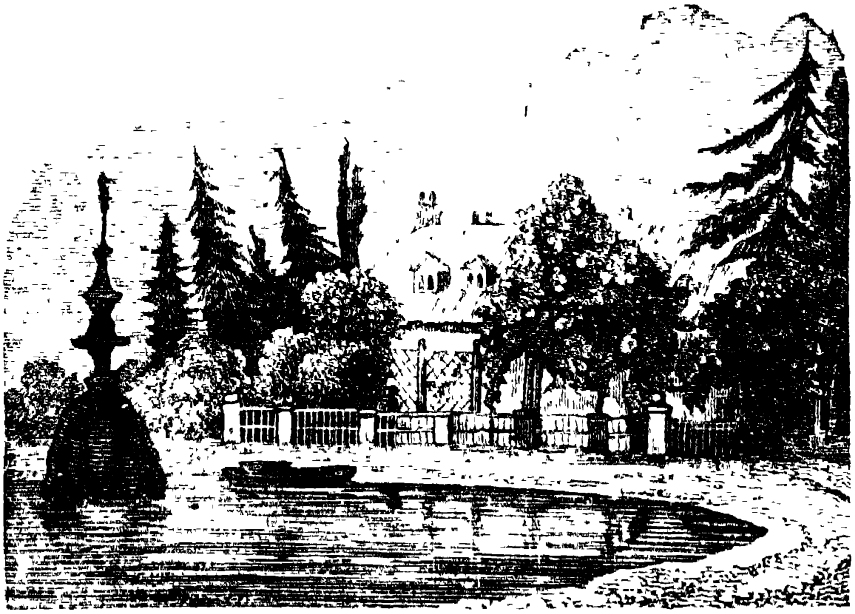
imagination in this dream of life is wisdom; and nothing is useless that, by furnishing mental employment, keeps us for awhile in oblivion of those stronger appetites that lead to evil. But every rank and state of mankind may find something to imitate in those delightful songsters; and we may not only employ the time, but mend our lives by the contemplation. From their courage in defence of their young, and their assiduity in incubation, the coward may learn to be brave, and the rash to be patient. The inviolable attachment of some of their companions may give lessons of fidelity; and the connubial tenderness of others be a monitor to the incontinent. Even those that are tyrants by nature never spread capricious destruction; and, unlike man, never inflict a pain but when urged by necessity.



A
HISTORY OF FISHES.

CHAP. I.

OF FISHES IN GENERAL.

THE ocean is the great receptacle of fishes. It has been thought, by some, that all fish are naturally of that salt element; and that they have mounted up into fresh water by some accidental migration. A few still swim up rivers to deposit their spawn; but of the great body of fishes, of which the size is enormous and the shoals are endless, those all keep to the sea, and would quickly expire in fresh water. In that extensive and undiscovered abode, millions reside, whose manners are a secret to us, and whose very form is unknown. The curiosity of mankind, indeed, has drawn some from their depths, and his wants many more. With the figure of these, at least, he is acquainted; but for their pursuits, migrations, societies, antipathies, pleasures, times of gestation, and manner of bringing forth, these all are hidden in the turbulent element that protects them.

The number of fish to which we have given names, and of the figure, at least, of which we know something, according to Linnæus, are above four hundred.* Thus to appearance, indeed, the history of fish is tolerably copious; but when we come to examine, it will be found that of the greatest part of these we know very little. Those qualities, singularities, or advantages, that render animals worth naming, still remain to be discovered. The history of fishes, therefore, has little in it entertaining: for our philosophers hitherto, instead of studying their nature, have been employed in increasing their catalogues; and the reader, instead of observations or facts, is presented with a long list of names that disgust him with their barren superfluity. It must displease him to see the language of a science increasing, while the science itself has nothing to repay the increasing tax laid upon his memory.

Most fish offer us the same external form; sharp at either end, and swelling in the middle; by which they are enabled to traverse the fluid which they inhabit with greater celerity and ease That peculiar shape which Nature has granted to most fishes we endeavour to imitate in such vessels as are designed to sail with the greatest swiftness: however, the progress of a machine moved forward in the water by human contrivance is nothing to the rapidity of an animal destined by Nature to reside there. Any of the large fish overtake a ship in full sail with great ease, play round it without effort, and outstrip it at pleasure. Every part of the body seems exerted in this despatch; the fins, the tail, and the motion of the whole back-bone, assist progression; and it is to that flexibility of body, at which art cannot arrive, that fishes owe their great velocity.

The chief instruments in a fish's motion are the fins; which, in some fish, are much more numerous than in others. A fish, completely fitted for sailing, is furnished with not less than two pairs; also three single fins, two above and one below. Thus equipped, it migrates with the utmost rapidity, and takes voyages of a thousand leagues in a season. But it does not always happen that such fish as have the greatest number of fins have the swiftest motion: the shark is thought to be one of the swiftest swimmers, yet it wants the ventral or belly fins; the haddock does not move so swift, yet it is completely fitted for motion

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* About fifteen hundred species of fish are now known, and of this number about two hundred are found on the coast or in the inland waters of Britain.—ED.

But the fins serve not only to assist the animal in progression, but in rising or sinking, in turning, or even leaping out of the water. To answer these purposes, the pectoral fins serve, like oars, to push the animal forward; they are placed at some little distance behind the opening of the gills; they are generally large and strong, and answer the same purposes to the fish in the water as wings do to a bird in the air. Next these are seen the ventral fins, placed toward the lower part of the body, under the belly: these are always seen to lie flat on the water, in whatever situation the fish may be; and they serve rather to raise or depress the fish in its element, than to assist progressive motion. The dorsal fin is situated along the ridge of the back; and serves to keep it in equilibrio, as also to assist its progressive motion. In many fishes this is wanting; but in all flat fishes it is very large, as the pectoral fins are proportionably small. The anal fin occupies that part of the fish which lies between the anus and the tail; and this serves to keep the fish in its upright or vertical situation. Lastly, the tail, which in some fishes is flat, and upright in others, seems the grand instrument of motion: the fins are but all subservient to it, and give direction to its great impetus, by which the fish seems to dart forward with so much velocity. From hence it appears that each of these instruments has a peculiar use assigned it; but, at the same time, that they all conspire to assist each other's motions.

As most animals that live upon land are furnished with a covering to keep off the injuries of the weather, so all that live in the water are covered with a slimy, glutinous matter, that, like a sheath, defends their bodies from the immediate contact of the surrounding fluid. This substance may be considered as a secretion from the pores of the animal's body; and serving, not only to defend, but to assist the fish's easy progress through the water. Beneath this, in many kinds, is found a strong covering of scales, that, like a coat of mail, defend it still more powerfully; and under that, before we come to the muscular parts of the body, an oily substance, which supplies the requisite warmth and vigour.

The fish, thus protected and fitted for motion in its natural element, seems as well furnished with the means of happiness as quadrupeds or birds; but if we come to examine its faculties more nearly, we shall find it very much their inferior. The sense of touching, which beasts and birds have in a small degree, the fish, covered up in its own coat of mail, can have but little acquaintance with.

The sense of smelling, which in beasts is so exquisite, and among birds is not wholly unknown, seems given to fishes in a very moderate proportion. It is true that all fishes have one or more nostrils; and even those that have not the holes perceptible without, yet have the proper formation of the bones for smelling within. But as air is the only medium we know for the distribution of odours, it cannot be supposed that these animals, residing in water, can be possessed of any power of being affected by them.

As to tasting, they seem to make very little distinction: the palate of most fish is hard and bony, and consequently incapable of the powers of relishing different substances.

Hearing in fishes is found still more imperfect, if it be found at all. Certain it is, that anatomists have not been able to discover, except in the whale kind, the smallest traces of an organ, either within or without the head of fishes. It is true that in the centre of the brain of some fishes are found, now and then, some little bones, the number and situation of which are entirely accidental. These bones, Klein has supposed to constitute the organ of hearing; but if we consider their entire dissimilitude to the bones that serve for hearing in other animals, we shall be of another opinion. The greatest number of fishes are deprived of the bones entirely: some fish have them in small numbers, and others in abundance, yet neither testify any excellence or defect in hearing.

Indeed, of what advantage would this sense be to animals that are incapable of making themselves heard? They have no voice to communicate with each other, and consequently have no need of an organ for hearing. Mr. Gouan, who kept some gold fishes in a vase, informs us that, whatever noise he made, he could neither disturb nor terrify them: he hallooed as loud as he could, putting a piece of paper between his mouth and the water to prevent the vibrations from affecting the surface, and the fishes still seemed insensible; but when the paper was removed, and the sound had its full play upon the water, the fishes seemed instantly to feel the change, and shrunk to the bottom. From this we may learn that fishes are as deaf as they are mute; and that when they seem to hear the call of a whistle or a bell at the edge of a pond, it is rather the vibrations of the sound that affect the water, by which they are excited, than any sounds that they hear.*

Seeing seems to be the sense fishes are possessed of in the greatest degree; and yet even this seems obscure, if we compare it to that of other animals.

From all this, it appears how far fish fall behind terrestrial animals in their sensations, and consequently in their enjoyments.† Even their brain, which is by some supposed to be of a size with every animal's understanding, shows that fish are inferior even to birds in this particular. It is divided into three parts, surrounded with a whitish froth, and gives off nerves as well to the sense of sight as of smelling. In some fish it is grey, in others white; in some it is flatted, in others round; but in all extremely small compared to the bulk of an animal.

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* Hearing in Fishes.—It was well ascertained by Dr. John Hunter, that fishes possess the sense of hearing, and that water is an excellent medium for the conveyance of sound. Their organ of hearing is placed on the sides of the skull, or the cavity that contains the brain; but, differing in this respect from that in quadrupeds and birds, it is entirely distinct and detached from the skull. In some fishes, as those of the ray kind, the organ of hearing is wholly surrounded by the parts containing the cavity of the skull; in others, as the salmon and cod, it is in part within the skull. In structure, it is by no means so complicated as in the quadrupeds and other animals who live in the air. Some genera, as the rays, have the external orifice very small, and placed on the upper surface of the head; but in others, there is no external opening whatever.

† Comparison between Birds and Fishes.—The aerial being discovers with facility an immense horizon: its subtile ear appreciates every sound, every intonation, which it reproduces with its voice. If its beak is hard, if its body is covered with a kind of down to preserve it from the intense cold of the high regions which it visits, it finds in its legs all the perfection of the most delicate touch. It enjoys all the sweets of conjugal and paternal love, and it fulfils all its duties with courage. The parents defend each other, and also their offspring: a most surprising art presides in the construction of their habitations. When the season is come, they work together and without remission; while the mother hatches the eggs with an extraordinary patience, the father, from an impetuous lover, becomes the most tender husband, and delights with his songs the melancholy of his mate. The bird, even in confinement, attaches itself to its master; it submits to him, and executes, by his order, the most neat and delicate actions; it hunts for him like a dog, and returns at his voice from the greatest height in the air; it imitates even his language; and it is with some degree of difficulty that we are compelled to refuse it a kind of reason.

The inhabitant of the water does not attach itself. It has no language, no affection; it does not know what it is to be husband and father, or to make an abode for itself. In time of danger it hides itself under the rocks of the ocean, or rushes down into the depths of the sea: its life is monotonous; its voracity leads to its sole employment, and it is only thereby that we are able to direct its motions by certain signs from above. Yet these beings, who possess so few enjoyments, have been adorned by nature with all kinds of beauty, variety in their forms, elegance in their proportions, diversity of colour: they have everything adapted to attract the attention of man, and it seems that it was this attention that nature was desirous to excite. Reflecting the lustre of every metal and precious stone—refracting the colours of the rainbow, in bands, in spots, in undulating, angular, but always regular and symmetrical lines, and always in shades admirably arranged and contrasted; for what purpose have they received these gifts?—they who hardly see one another in depths where light can scarcely penetrate, and who, could they gaze on one another, can scarcely be supposed to feel any kind of pleasure by relations thus established.—Cuvier.

Thus Nature seems to have fitted these animals with appetites and powers of an inferior kind; and formed them for a sort of passive existence in the obscure and heavy element to which they are consigned. A ceaseless desire of food seems to give the ruling impulse to all their motions. This appetite impels them to encounter every danger; and, indeed, their rapacity seems insatiable. Even when taken out of the water, and almost expiring, they greedily swallow the very bait by which they were allured to destruction.

The maw is, in general, placed next the mouth; and though possessed of no sensible heat, is, however, endued with a surprising faculty of digestion. Its digestive power seems, in some measure, to increase with the quantity of food it is supplied with; a single pike having been known to devour a hundred roaches in three days. Its faculties, also, are as extraordinary; for it digests not only fish, but much harder substances, prawns, crabs, and lobsters, shells and all.

Yet, though fish are thus hungry, and for ever prowling, no animals can suffer the want of food for so long a time. The gold and silver fish we keep in vases seem never to want any nourishment at all; whether it be that they feed on the water insects, too minute for our observation, or that water alone is a sufficient supply, is not evident; but they are often seen for months without apparent sustenance. Even the pike, the most voracious of fishes, will live in a pond where there is none but himself; and, what is more extraordinary, will be often found to thrive there.

Still, however, fish are of all other animals the most voracious and insatiable. Whatever any of them is able to swallow, possessed of life, seems to be considered as the most desirable food. Some that have very small mouths feed upon worms and the spawn of other fish: others, whose mouths are larger, seek larger prey; it matters not of what kind, whether of another or their own. Those with the largest mouths pursue almost everything that has life; and often meet each other in fierce opposition, when the fish with the largest swallow comes off with the victory, and devours its antagonist.

Nor is the pursuit of fishes, like that of terrestrial animals, confined to a single region, or to one effort; shoals of one species follow those of another through vast tracts of ocean, from the vicinity of the pole even down to the equator. Thus the cod, from the banks of Newfoundland, pursues the whiting, which flies before it even to the southern shores of Spain. The cachalot is said in the same manner to pursue a shoal of herrings, and to swallow thousands at a gulp.

This may be one cause of the annual migration of fishes from one part of the ocean to the other; but there are other motives which come in aid of this also. Fishes may be induced to change the place of their residence for one more suited to their constitutions, or more adapted to depositing their spawn. It is remarkable that no fish are fond of very cold waters, and generally frequent those places where it is warmest. Thus, in summer, they are seen in great numbers in the shallows near the shore, where the sun has power to warm the water to the bottom; on the contrary, in winter, they are found towards the bottom in the deep sea, for the cold of the atmosphere is not sufficiently penetrating to reach them at those great depths. Cold produces the same effect upon fresh-water fishes; and, when they are often seen dead after severe frosts, it is most probable that they have been killed by the severity of the cold, as well as by their being excluded by the ice from air.

All fish live in the water; yet they all stand in need of air for their support. Those of the whale kind, indeed, breathe the air in the same manner as we do, and come to the surface every two or three minutes to take a fresh inspiration; but those which continue entirely under water, are yet under a necessity of being supplied with air, or they will expire in a very few minutes. We sometimes see all the fish of a pond killed, when the ice everywhere covers the surface of the water, and thus keeps off the air from the subjacent fluid.

So very necessary is air to all animals, but particularly to fish, that, as was said, they can live but a few minutes without it: yet nothing is more difficult to be accounted for than the manner in which they obtain this necessary supply.

Those who have seen a fish in the water must remember the motion of its lips and its gills, or at least of the bones on each side that cover them. This motion in the animal is, without doubt, analogous to our breathing; but it is not air, but water, that the fish actually sucks in and spouts out through the gills at every motion. The manner of its breathing is thus: the fish first takes a quantity of water by the mouth, which is driven to the gills; these close and keep the water so swallowed from returning by the mouth; while the bony covering of the gills prevents it from going through them, until the animal has drawn the proper quantity of air from the body of water thus imprisoned: then the bony covers open and give it a free passage: by which means, also, the gills again are opened and admit a fresh quantity of water. Should the fish be prevented from the free play of its gills, or should the bony covers be kept from moving by a string tied round them, the animal would soon fall into convulsions and die in a few minutes.

But though this be the general method of explaining respiration in fishes, the difficulty remains to know what is done with this air, which the fish in this manner separates from the water. There seems no receptacle for containing it; the stomach, being the chief cavity within the body, is too much filled with aliment for that purpose. There is indeed a cavity, and that a pretty large one—I mean the air-bladder, or swim, which may serve to contain it for vital purposes; but that our philosophers have long destined to a very different use. The use universally assigned to the air-bladder is the enabling the fish to rise or sink in the water at pleasure, as that is dilated or compressed. The use assigned by the ancients for it was to come in aid of the lungs, and to remain as a kind of storehouse of air to supply the animal in its necessities. I own my attachment to this last opinion; but let us exhibit both with their proper share of evidence, and the reader must be left to determine.

The air-bladder is described as a bag filled with air, sometimes composed of one, sometimes of two, and sometimes of three divisions, situated towards the back of the fish, and opening into the maw or the gullet. Those who contend that this bag is designed for raising or depressing the fish in the water, build upon the following experiment. A carp being put into the air-pump, and the air exhausted, the bladder is said to expand itself to such a degree, that the fish swells in an extraordinary manner till the bladder bursts, and then the fish sinks, and ever after continues to crawl at the bottom. On another occasion, the air-bladder was pricked and wounded, which let out its air; upon which the fish sunk to the bottom, and was not seen to rise after. From thence it is inferred, that the use of the air-bladder must be by swelling at the will of the animal, thus to increase the surface of the fish's body, and thence diminishing its specific gravity, to enable it to rise to the top of the water, and keep there at pleasure. On the contrary, when the fish wants to descend, it is, say they, but to exhaust this bladder of its air; and the fish being thus rendered slimmer and heavier, consequently sinks to the bottom.

But the truth is, the fish can neither increase nor diminish the quantity of air in its air-bladder at will, no more than we can that which is contained in our stomachs. The animal has no one muscle, much less pair of muscles, for contracting or dilating this organ; its aperture is from the gullet; and what air is put into it must remain there till the necessities, and not the will, of the animal call it forth as a supply.

But, to put the matter past a doubt, many fish are furnished with an air-bladder that continually crawl at the bottom; such as the eel and the flounder; and many more are entirely without any bladder, that swim at ease in every depth; such as the anchovy and fresh-water gudgeon.(g) Indeed, the number of fish that want this organ is alone a sufficient proof that it is not so necessary for the purposes of swimming; and as the ventral fins, which in all fish lie flat upon the water, seem fully sufficient to keep them at all depths, I see no great occasion for this internal philosophical apparatus for raising and depressing them. Upon the whole, the air-bladder seems adapted for different purposes than that of keeping the fish at different depths in the water; but whether it be to supply them with air when it is wanted from without, or for what other purpose, I will not take upon me to determine.

(g) Redi.

Hitherto we have seen fish in every respect inferior to land animals; in the simplicity of their conformation, in their senses and their enjoyments; but of that humble existence which they have been granted by nature, they have a longer term than any other class of animated nature. "Most of the disorders incident to mankind," says Bacon, "arise from the changes and alterations of the atmosphere; but fishes reside in an element little subject to change; theirs is an uniform existence; their movements are without effort, and their life without labour. Their bones, also, which are united by cartilages, admit of indefinite extension; and the different sizes of animals of the same kind among fishes is very various. They still keep growing; their bodies, instead of suffering the rigidity of age, which is the cause of natural decay in land animals, still continue increasing with fresh supplies; and, as the body grows, the conduits of life furnish their stores in greater abundance. How long a fish, that seems to have scarce any bounds put to its growth, continues to live, is not ascertained; perhaps the life of a man would not be long enough to measure that of the smallest."

There have been two methods devised for determining the age of fishes, which are more ingenious than certain; the one is by the circles of the scales, the other by the transverse section of the back-bone. The first method is this:—When a fish's scale is examined through a microscope, it will be found to consist of a number of circles, one circle within another, in some measure resembling those which appear upon the transverse section of a tree, and supposed to offer the same information. For as in trees we can tell their age by the number of their circles, so in fishes we can tell theirs by the number of circles in every scale, reckoning one ring for every year of the animal's existence. By this method, Buffon found a carp, whose scales he examined, to be not less than a hundred years old; a thing almost incredible, had we not several accounts in other authors which tend to confirm the discovery. Gesner brings us an instance of one of the same age; and Albertus of one more than double that period.

The age of the skate and the ray, that want scales, may be known by the other method; which is, by separating the joints of the back-bone, and then minutely observing the number of rings which the surface where it was joined exhibits. By this the fish's age is said to be known; and perhaps with as much certainty as in the former instance.

But how unsatisfactory soever these marks may be, we have no reason to doubt the great age of some fishes. Those that have ponds often know the oldest by their superior size. But the longevity of these animals is nothing when compared to their fecundity. All sorts, a few of the larger ones excepted, multiply their kind some by hundreds and some by millions. There are some that bring forth their young alive, and some that only produce eggs: the former are rather the least fruitful; yet even these are seen to produce in great abundance. The viviparous blenny, for instance, brings forth two or three hundred at a time, all alive and playing round the parent together. Those who exclude their progeny in a more imperfect state, and produce eggs, which they are obliged to leave to chance, either on the bottom, at the edge of the water, or floating on the surface where it is deeper, are all much more prolific; and seem to proportion their stock to the danger there is of its consumption. Of these eggs thus deposited, scarce one in a hundred brings forth an animal; they are devoured by all the lesser fry that frequent the shores; by aquatic birds near the margin, and by the larger fish in deep water. Still, however, there are enough for supplying the deep with inhabitants; and notwithstanding their own rapacity, and that of the fowls of various tribes, the numbers that escape are sufficient to relieve the wants of a very considerable part of mankind. Indeed, when we consider the numbers that a single fish is capable of producing, the amount will seem astonishing. If, for instance, we should be told of a being so very prolific that, in a single season, it could bring forth as many of its kind as there are inhabitants in England, it would strike us with surprise; yet a single cod produces full that number. The cod spawns in one season, as Lewenhoeck assures us, above nine millions of eggs or peas contained in one single roe. The flounder is commonly known to produce above one million; and the mackerel above five hundred thousand. Such an amazing increase, if permitted to come to maturity, would overstock nature, and even the ocean itself would not be able to contain, much less to provide for, the half of its inhabitants. But two wise purposes are answered by this amazing increase; it preserves the species in the midst of numberless enemies, and serves to furnish the rest with a sustenance adapted to their nature.

Fishes seem, all except the whale kind, entirely divested of those parental solicitudes which so strongly mark the manner of the more perfect terrestrial animals. How far they copulate remains as yet a doubt; for though they seem to join, yet the male is not furnished with any external instrument of generation. It is said, by some, that his only end in that action is to emit his impregnating milt upon the eggs that at that time fall from the female. He is said to be seen pursuing them as they float down the stream, and carefully impregnating them one after another. On some occasions, also, the females dig holes in the bottom of rivers and ponds, and there deposit their spawn, which is impregnated by the male in the same manner. All this, however, is very doubtful; what we know with certainty of the matter, and that not discovered till very lately, is, that the male has two organs of generation, that open into the bladder of urine; and that these organs do not open into the rectum, as in birds, but have a particular aperture of their own.(*g*) These organs of generation in the male are empty at some seasons of the year; but before the time of spawning they are turgid with what is called the milt, and emit the fluid proper for impregnation.

Fish have different seasons for depositing their spawn: some, that live in the depths of the ocean, are said to choose the winter months; but, in general, those with which we are acquainted choose the hottest months in summer, and prefer such water as is somewhat tepified by the beams of the sun. They then leave the deepest parts of the ocean, which are the coldest, and shoal round the coasts, or swim up the fresh water rivers, which are warm, as they are comparatively shallow. When they have deposited their burthens, they then return to their old stations, and leave their nascent progeny to shift for themselves.

The spawn continues in its egg state in some fish longer than in others, and this in proportion to the animal's size. In the salmon, for instance, the young animal continues in the egg from the beginning of December till the beginning of April; the carp continues in the egg not above three weeks; the little goldfish from China is produced still quicker. These all, when excluded, at first escape by their minuteness and agility. They rise, sink, and turn much readier than grown fish; and they can escape into very shallow waters when pursued. But, with all their advantages, scarce one in a thousand survives the numerous perils of its youth. The very male and female that have given them birth are equally dangerous and formidable with the rest, forgetting all relation at their departure.

Such is the general picture of these heedless and hungry creatures: but there are some in this class, living in the waters, that are possessed of finer organs and higher sensations; that have all the tenderness of birds or quadrupeds for their young; that nurse them with constant care, and protect them from every injury. Of this class are the *Cetaceous* tribe, or the fishes of the whale kind. There are others, though not capable of nursing their young, yet that bring them alive into the world, and defend them with courage and activity. These are the *Cartilaginous* kinds, or those who have gristles instead of bones. But the fierce, unmindful tribe we have been describing, that leave their spawn without any protection, are called the *Spinous*, or bony kinds, from their bones resembling the sharpness of thorns.

Thus there are three grand divisions in the fish kind—the *cetaceous*, the *car-*

(*g*) Vide Gaman de Generatione.

tilaginous, and the *spinous*; all differing from each other in their conformation, their appetites, in their bringing forth, and in the education of their young. These three great distinctions are not the capricious differences formed by a maker of systems, but are strongly and firmly marked in nature.

I cannot conclude this chapter without putting a question to the learned, which, I confess, I am not able to resolve. How comes it that fish, which are bred in a salt element, have yet no salt to the taste, or that is capable of being extracted from it?*

CHAP. II.

CETACEOUS FISHES IN GENERAL.

As on land there are some orders of animals that seem formed to command the rest, with greater powers and more various instincts, so in the ocean there are fishes which seem formed upon a nobler plan than others, and that, to their fishy form, join the appetites and the conformation of quadrupeds. These all are of the *cetaceous* kind; and so much raised above their fellows of the deep in their appetites and instincts that almost all our modern naturalists have fairly excluded them from the finny tribes, and will have them called, not fishes, but great beasts of the ocean. With them it would be as improper to say men go to Greenland fishing for whale, as it would be to say that a sportsman goes to Blackwall a-fowling for mackerel.

Yet, notwithstanding philosophers, mankind will always have their own way of talking; and, for my own part, I think them here in the right. A different formation of the lungs, stomach, and intestines, a different manner of breathing or propagating, are not sufficient to counterbalance the great obvious analogy which these animals bear to the whole finny tribe. They are shaped as other fishes; they swim with fins; they are entirely naked, without hair; they live in the water, though they come up to breathe; they are only seen in the depths of the ocean, and never come upon shore but when forced thither. These sure are sufficient to plead in favour of the general denomination, and acquit mankind of error in ranking them with their lower companions of the deep.

But still they are as many degrees raised above other fishes in their nature as they are in general in their size. This tribe is composed of the Whale and its varieties, of the Cachalot, the Dolphin, the Grampus, and the Porpoise. All these resemble quadrupeds in their internal structure, and in some of their appetites and affections. Like quadrupeds, they have lungs, a midriff, a stomach, intestines, liver, spleen, bladder, and parts of generation: their heart, also, resembles that of quadrupeds, with its partitions closed up as in them, and driving red and warm blood in circulation through the body.

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* SALT WATER ON FISH.—Though fishes live in a salt element they do not subsist on it. All the water they take into their mouths is again discharged through the gills, after retaining the air contained in it for the purposes of life. The medium of water answers the precise purpose to fishes that the medium of air does to man and other land animals. In inspiration, the element is received into the lungs or gills, and in expiration is returned, deprived of its purer parts, which are retained for the purposes of animal economy. And whatever salt may be taken into the stomachs of fishes with their food, is decomposed and separated into its component parts of acid and soda. The sailor that feeds for twelve months together on salted meats has not his own flesh made salt; but a decomposition taking place during the process of digestion, he becomes corrupted and scorbutic by the excess of soda and magnesia.

As these animals breathe the air, it is obvious that they cannot bear to be any long time under water. They are constrained, therefore, every two or three minutes to come up to the surface to take breath, as well as to spout out through their nostril, for they have but one, that water which they sucked in while gaping for their prey.*

The senses of these animals seem also superior to those of other fishes. The eyes of other fishes, we have observed, are covered only with that transparent skin that covers the rest of the head; but in all the cetaceous kinds it is covered by eyelids, as in man. This, no doubt, keeps that organ in a more perfect state, by giving it intervals of relaxation, in which all vision is suspended. The other fishes, that are for ever staring, must see, if for no other reason, more feebly, as their organs of sight are always exerted.

As for hearing, these also are furnished with the internal instruments of the ear, although the external orifice no where appears. It is most probable that this orifice may open by some canal, resembling the Eustachian tube, into the mouth; but this has not as yet been discovered.

Yet Nature sure has not thus formed a complete apparatus for hearing, and denied the animal the use of it when formed. It is most likely that all animals of the cetaceous kind can hear, as they certainly utter sounds and bellow to each other. This vocal power would be as needless to animals naturally deaf as glasses to a man that was blind.

But it is in the circumstances in which they continue their kind that these animals show an eminent superiority. Other fish deposit their spawn, and leave the success to accident: these never produce above one young, or two at the most; and this the female suckles entirely in the manner of quadrupeds, her breasts being placed, as in the human kind, above the navel.

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* Economy of the Whale.—The Greenland whale affords to us a sublime instance of contrivance, compensating its total want of teeth in the hundreds of plates of whalebone which cover the roof of its mouth, and which, by their growth, increasing in length and in breadth, often acquire twelve feet in length and fifteen inches broad. There have, indeed been some instances in which whalebone has attained fifteen feet in length, since those whales which afford whalebone of twelve feet are themselves more than sixty feet in length. The upper surface of the skull of a whale of this size measured twenty feet eight inches long; and the creature itself measured upwards of a hundred tons. The roots of the two sides of the arch of whalebone in the mouth of this animal nearly meet at the top of the roof, whence they grow, at the anterior part of the mouth, but they gradually recede from each other, as they are continued backwards, till they approach the throat, when they again approximate. This substance, called whalebone, which thus supplies the place of teeth, consists of a peculiar kind of horn. Its plates differ in their length and strength in different parts of the mouth: but the outer row of plates are by far the longest and the strongest, especially those which are midway between the throat and the snout. As the fibres of every plate are loose and separate at its inferior edge, forming a deep, pendent fringe, by the gradual splitting away of its substance in proportion as it is used, the entire vaulted sides of the roof of the mouth, in fact, by these means is deeply lined with a clothing of thick and coarse hair, whence the ancients gave to this species of whale the name of mysticetus. Beneath this vault of hair lies the enormous tongue of the whale, and exterior to it is the immensely high lower lip, which, when the jaws are closed, shuts up over all externally, to the very origin of the whale above, so as to entirely conceal it from view. By means, also, of this formation of the lip, and the circumstance of the upper jaw shutting into a cartilaginous groove at the extremity of the lower one, the most perfect valve is formed, which any pressure from without only tends to render more secure from the ingress of the water. The fringe produced by the whalebone (as it is constantly and gradually extending itself in length, by the growth of the whalebone behind it, in proportion as it is worn away) is thus always in a proper state of adaptation to the marvellous economy of the creature; for the most curious part of this beautiful mechanism is the net, or sieve, which it thus forms, an instrument which has been granted to this largest of creatures for the purpose of straining or separating its minute prey from the water necessarily taken into the mouth with it when feeding. For, in this whale, the mouth is of such enormous proportions, as to receive at once even tons of water, and yet of such wonderful perfection is its filtering mechanism through these hair-like filaments, that it rarely allows the escape of the nourishing particles diffused therein, although they be no larger than peas; its food consisting chiefly of small medusae, crustacea, and zoophytes.

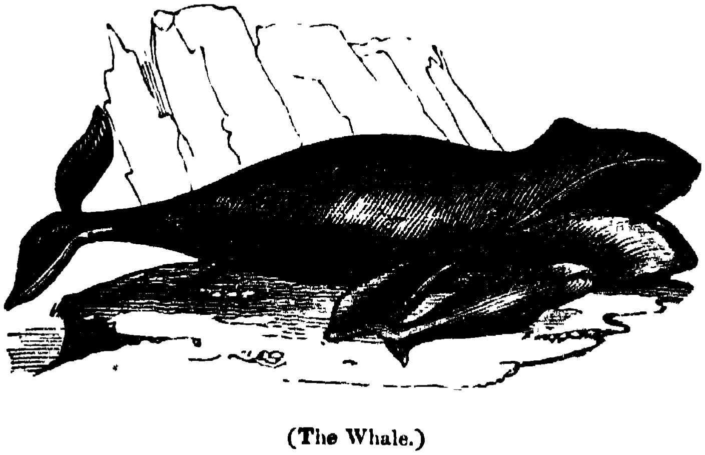
The whale or the grampus are terrible at any time; but are fierce and desperate in the defence of their young. In Waller's beautiful poem of the Summer Islands we have a story, founded upon fact, which shows the maternal tenderness of these animals for their offspring. A whale and her cub had got into an arm of the sea, where, by the desertion of the tide, they were inclosed on every side. The people from shore soon saw their situation, and drove down upon them in boats, with such weapons as the urgent occasion offered. The two animals were soon wounded in several places, and the whole sea round was tinctured with their blood. The whales made several attempts to escape; and at last the old one, by its superior strength, forced over the shallow, into the depths of the ocean. But though in safety herself, she could not bear the danger that awaited her young one; she, therefore, rushed in once more where the smaller animal was imprisoned, and resolved, when she could not protect, at least to share his danger The story ends with poetical justice; for the tide coming in, brought off both in safety from their enemies, though not without sustaining an infinite number of wounds in every part.

Of these enormous animals, some are without teeth, and properly called whales; others have the teeth only in the lower jaw, and are called, by the French, Cachalots; the narwhal has teeth only in the upper jaw; the dolphin's teeth, as well as those of the porpoise and grampus, are both above and below. These are the marks that serve to distinguish the kinds of this enormous tribe from each other; and these shall serve to guide us in giving their history.

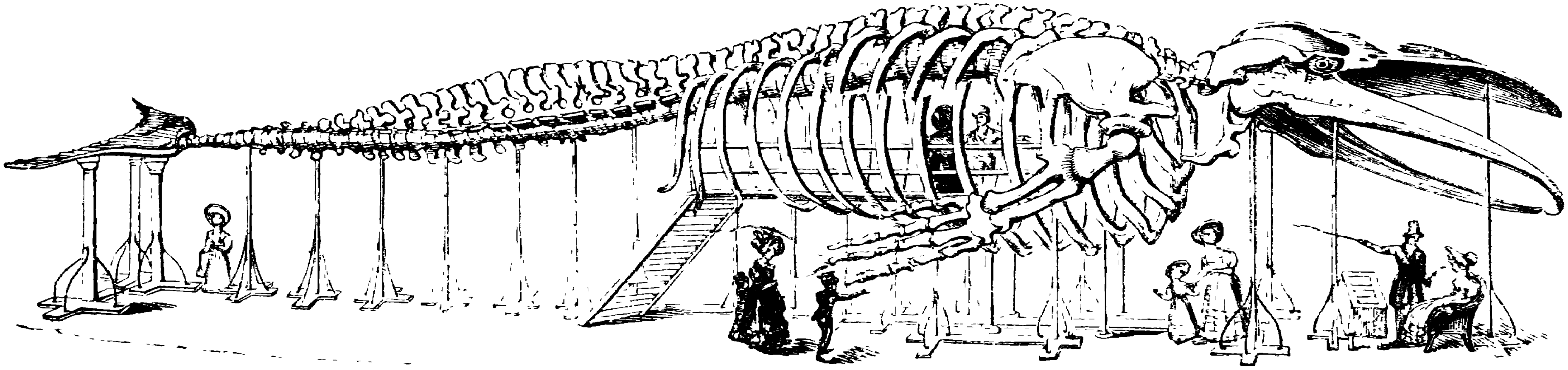
CHAP. III.

THE WHALE, PROPERLY SO CALLED, AND ITS VARIETIES.

If we compare land animals, in respect to magnitude, with those of the deep, they will appear contemptible in the competition. It is probable, indeed, that quadrupeds once existed much larger than we find them at present. From the skeletons of some that have been dug up at different times, it is evident that there must have been terrestrial animals twice as large as the elephant; but creatures of such an immense bulk required a proportionable extent of ground for subsistence, and, by being rivals with men for large territory, they must have been destroyed in the contest.



(The Whale.)



SKELETON OF A WHALE.

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But it is not only upon land that man has exerted his power of destroying the larger tribes of animated nature; he has extended his efforts even in the midst of the ocean, and has cut off numbers of those enormous animals that had, perhaps, existed for ages. We now no longer hear of whales two hundred and two hundred and fifty feet long, which we are certain were often seen about two centuries ago. They have all been destroyed by the skill of mankind, and the species is now dwindled into a race of diminutive animals, from thirty to about eighty feet long.

The northern seas were once the region to which the greatest of these animals resorted; but so great has been the slaughter of whales for more than two ages that they begin to grow thinner every day; and those that are found there seem, from their size, not come to their full dimensions.

Taking the whale, however, at the ordinary size of eighty feet long and twenty feet high, what an enormous animated mass must it appear to the spectator! With what amazement must it strike him to behold so great a creature gambolling in the deep with the ease and agility of the smallest animal, and making its way with incredible swiftness!

The whale is the largest animal of which we have any certain information; and the various purposes to which, when taken, its different parts are converted, have brought us tolerably acquainted with its history.* Of the whale, properly so called, there are no less than seven different kinds; all distinguished from each other by their external figure or internal conformation. The Great Greenland Whale, without a back-fin, and black on the back; the Iceland Whale, without a back fin, and whitish on the back; the New England Whale, with a hump on the back; the Whale, with six humps on the back; the Fin fish, with a fin on the back near the tail; the Pike headed Whale, and the Round-lipped Whale. All these differ from each other in figure, as their names obviously imply. They differ, also, somewhat in their manner of living; the fin-fish having a larger swallow than the rest, being more active, slender, and fierce, and living chiefly upon herrings. However, they are none of them very voracious; and, if compared to the Cachalot, that enormous tyrant of the deep, they appear harmless and gentle. The history of the rest, therefore, may be comprised under that of the Great Common Greenland Whale, with which we are best acquainted.

The Great Greenland Whale is the fish for taking which there are such preparations made in different parts of Europe. It is a large, heavy animal, and the head alone makes a third of its bulk. It is usually found from sixty to seventy feet long. The fins on each side are from five to eight feet, composed of bones and muscles, and sufficiently strong to give the great mass of body which they move speed and activity The tail, which lies flat on the water, is about twenty-four feet broad, and, when the fish lies on one side, its blow is tremendous. The skin is smooth and black, and in some places marbled with white and yellow; which, running over the surface, has a very beautiful effect. This marbling is particularly observable in the fins and the tail. In the figures which are thus drawn by Nature, fancy often forms the pictures of trees landscapes, and houses. In the tail of one that was thus marbled, Ray tells us that the number 122 was figured very evenly and exact, as if done with a pencil.

The whale makes use only of the tail to advance itself forward in the water This serves as a great oar to push its mass along; and it is surprising to see with what force and celerity its enormous bulk cuts through the ocean. The fins are only made use of for turning in the water, and giving a direction to the velocity impressed by the tail. The female also makes use of them, when pursued, to bear off her young, clapping them on her back, and supporting them by the fins on each side from falling.

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* ENORMOUS WHALE.—The skeleton of a whale, ninety-five feet long by eighteen feet high, has lately been deposited in the Cabinet of Natural History at Ghent. In the opinion of many naturalists, among whom is M. Cuvier, this fish could not have been less than nine hundred or one thousand years old!

The outward or scarf skin of the whale is no thicker than parchment; but this removed, the real skin appears, of about an inch thick, and covering the fat or blubber that lies beneath: this is from eight to twelve inches in thickness: and is, when the fish is in health, of a beautiful yellow. The muscles lie beneath; and these, like the flesh of quadrupeds, are very red and tough.

The cleft of the mouth is above twenty feet long, which is near one third of the animal's whole length; and the upper jaw is furnished with barbs, that lie, like the pipes of an organ, the greatest in the middle, and the smallest to the sides. These compose the whale-bone; the longest spars of which are found to be not less than eighteen feet: the shortest, being of no value, are thrown away. The tongue is almost immovably fixed to the lower jaw, seeming one great lump of fat; and, in fact, it fills several hogsheads with blubber. The eyes are not larger than those of an ox; and when the crystaline humour is dried, it does not appear larger than a pea. They are placed towards the back of the head, being the most convenient situation for enabling them to see both before and behind; as also to see over them, where their food is principally found. They are guarded by eye-lids and eye-lashes, as in quadrupeds; and they seem to be very sharp-sighted.

Nor is their sense of hearing in less perfection; for they are warned, at great distances, of any danger preparing against them. It would seem as if Nature had designedly given them these advantages, as they multiply little, in order to continue their kind. It is true, indeed, that the external organ of hearing is not perceptible, for this might only embarrass them in their natural element; but as soon as the thin scarf-skin above mentioned is removed, a black spot is discovered behind the eye, and under that is the auditory canal that leads to a regular apparatus for hearing. In short, the animal hears the smallest sounds at very great distances, and at all times, except when it is spouting water; which is the time that the fishers approach to strike it.

These spout-holes or nostrils, in all the cetaceous tribe, have been already described: in this whale they are two; one on each side the head before the eyes, and crooked, somewhat like the holes on the belly of a violin. From these holes this animal blows the water very fiercely, and with such a noise that it roars like a hollow wind, and may be heard at three miles' distance. When wounded, it then blows more fiercely than ever, so that it sounds like the roaring of the sea in a great storm.

We have already observed, that the substance called whalebone, is taken from the upper jaw of the animal, and is very different from the real bones of the whale.* The real bones are hard, like those of great land animals, are very porous, and filled with marrow. Two great, strong bones sustain the under lip, lying against each other in the shape of a half-moon: some of these are twenty feet long, they are seen in several gardens set up against each other, and are usually mistaken for the ribs of this animal.

Such is the general conformation and figure of this great inhabitant of the deep, the precise anatomy of which has not been yet ascertained. In those places where they are caught in greatest abundance, the sailors are not very curious as to the structure of the viscera; and few anatomists care to undertake a task, where the operator, instead of separating with a lancet, must cut his way with an axe. It is as yet doubted, therefore, whether the whale, that in most points internally resembles a quadruped, may not have one great bowel fitted entirely for the reception of air, to supply it, when constrained to keep longer than usual at the bottom. The sailors universally affirm that it has; and philosophers have nothing but the analogy of its parts to oppose to their general assertions.*

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* CLOTH MADE FROM WHALEBONE.—M. Schultz, of Prague, has lately taken out a patent for the manufacture of a kind of cloth from whalebone. We are informed that the cloth obtained from this process bears a strong resemblance to silk, and is particularly adapted for making cravats, under-waistcoats, ribands, &c.—LONDON JOURNAL OF ARTS.

As these animals resemble quadrupeds in conformation, so they bear a strong resemblance in some of their appetites and manners. The female joins with the male, as it is asserted, *more humano,* and once in two years feels the accesses of desire.

The whale goes with young nine or ten months, and is then fatter than usual, particularly when near the time of bringing forth. It is said that the embryo, when first perceptible, is about seventeen inches long, and white; but the cub, when excluded, is black, and about ten feet long. She generally produces one young one, and never above two. When she suckles her young, she throws herself on one side on the surface of the sea, and the young one attaches itself to the teat. The breasts are two; generally hid within the belly; but she can produce them at pleasure, so as to stand forward a foot and a half, or two feet; and the teats are like those of a cow. In some the breasts are white; in others, speckled; in all, filled with a large quantity of milk, resembling that of land animals.

Nothing can exceed the tenderness of the female for her offspring; she carries it with her wherever she goes, and, when hardest pursued, keeps it supported between her fins. Even when wounded, she still clasps her young one;

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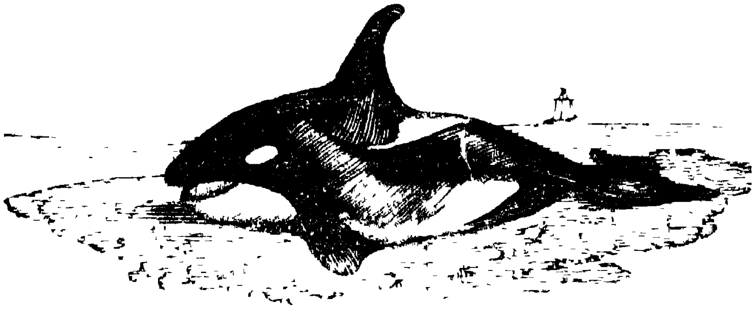
* GRAMPUS DELPHINUS ORCA, CAPTURED IN LYNN HARBOUR.—The animal, which is a male, was discovered by some fishermen, with his dorsal fin rising just above the surface of the water. He was immediately driven into the shallows, and attacked by the men; but not being provided with proper weapons, it was with much difficulty they were able to despatch him by the help of knives and sharpened oars. The groans of the poor animal are described as having been most horrible, and the effusion of blood very great Being at length deprived of life, he was towed up the river to the town, and landed on the quay, whence he was drawn by six horses through the streets, to the place where the carcass was flenched, or cut up



The descriptions of the grampus, in the works on natural history to which the writer had an opportunity of referring, do not exactly correspond with the above specimen; but that which approaches nearest to it is the following, taken from the last edition of the *Encyclopædia Brittanica.*

4th Genus.—DELPHINUS

'Maxilla utraque dentata: fistula in fronte
'Both jaws are furnished with teeth the spout in the forehead"

Delphinus *Orca Grampus*

The body is nearly oval. The dorsal fin is very high The teeth are conical and slightly curved The profile of the grampus is oval and oblong. The greatest thickness is about the middle of the trunk, from which it gradually diminishes towards both extremities The snout is short and round. The lower jaw is broader than the upper. Both jaws are furnished with conical teeth, which are unequal and curved at the top, and are from twenty to thirty in number in each jaw. The eyes are situated in the same line with the opening of the mouth. But the most distinguishing mark of the grampus is the dorsal fin, which rises from the middle of the back, and is nearly 4 feet in height. The pectoral fins are very broad and nearly oval. The tail fin is divided into two lobes in the form of a crescent The upper part of the body is black, the belly is white Sometimes white spots are discovered on the head and back The grampus is the largest fish belonging to the genus Some have been seen of 25 feet in length, by 12 or 13 in circumference and when she plunges to avoid danger, takes it to the bottom; but rises sooner than usual, to give it breath again.

They are a gregarious animal, which implies their want of mutual defence against the invasions of smaller, but more powerful, fishes. It seems astonishing, therefore, how a shoal of these enormous animals find subsistence together, when it would seem that the supplying even one with food would require greater plenty than the ocean could furnish. To increase our wonder, we not only see them herding together, but usually find them fatter than any other animals of whatsoever element. We likewise know that they cannot swallow large fishes, as their throat is so narrow, that an animal larger than a herring could not enter. How then do they subsist and grow so fat? A small insect which is seen floating in those seas, and which Linnæus terms the Medusa, is sufficient for this supply. These insects are black, and of the size of a small bean, and are sometimes seen floating in clusters on the surface of the water. They are of a round form, like snails in a box, but they have wings, which are so tender that it is scarce possible to touch them without breaking. These serve rather for swimming than flying; and the little animal is called by the Icelanders, the Walfischoas, which signifies the whale's provender. They have the taste of raw muscles, and have the smell of burnt sugar. These are the food of the whale, which it is seen to draw up in great numbers with its huge jaws, and to bruise between its barbs, which are always found with several of these sticking among them.

As the whale is an inoffensive animal, it is not to be wondered that it has many enemies, willing to take advantage of its disposition, and inaptitude for combat. There is a small animal, of the shell-fish kind, called the Whale-louse, that sticks to its body, as we see shells sticking to the foul bottom of a ship. This insinuates itself chiefly under the fins; and whatever efforts the great animal makes, it still keeps its hold, and lives upon the fat, which it is provided with instruments to arrive at.

The sword-fish, however, is the whale's most terrible enemy. "At the sight of this little animal," says Anderson, "the whale seems agitated in an extraordinary manner; leaping from the water as if with affright: wherever it appears, the whale perceives it at a distance, and flies from it in the opposite direction. I have been myself," continues he, "a spectator of their terrible encounter. The whale has no instrument of defence except the tail; with that it endeavours to strike the enemy; and a single blow taking place, would effectually destroy its adversary: but the sword-fish is as active as the other is strong, and easily avoids the stroke; then bounding into the air, it falls upon its great subjacent enemy, and endeavours, not to pierce with its pointed beak, but to cut with its toothed edges. The sea all about is soon dyed with blood, proceeding from the wounds of the whale; while the enormous animal vainly endeavours to reach its invader, and strikes with its tail against the surface of the water, making a report at each blow louder than the noise of a cannon."

But of all the enemies of these enormous fishes, man is the greatest: he alone destroys more in a year than the rest in an age, and actually has thinned their numbers in that part of the world where they are chiefly sought. The great resort of these animals was found to be on the inhospitable shores of Spitzbergen; where the distance of the voyage, the coldness of the climate, the terrors of the icy sea, and, still more, their own formidable bulk, might have been expected to protect them from human injury. But all these were but slight barriers against man's arts, his courage, and his necessities. The European ships, soon after the improvement of navigation, found the way into those seas; and as early as the beginning of the fourteenth century, the Biscayneers were in possession of a very considerable trade to the coasts of Greenland. The Dutch and the English followed them thither, and soon took that branch of commerce out of their hands. The English commenced the business about the beginning of the seventeenth century; and the town of Hull had the honour of first attempting that profitable branch of trade.

The art of taking whales, like most others, is much improved by time, and differs in many respects from that practised by the Biscayneers, when they first frequented the icy sea. But as the description of their methods is the least complicated, and consequently the easiest understood, it will be best suited to our purpose.

For this navigation, the Biscayneers, in favourable seasons, fitted out thirty ships, of two hundred and fifty tons each, with fifty choice men a piece, and a few boys.* These were stored with six months' provision; and each ship had its boats, which were to be serviceable when come to the place of duty. When arrived at the part where the whales are expected to pass to the southward, they always keep their sails set, and a sailor is placed at the mast-head, to give information when he spies a whale. As soon as he discovers one, the whole crew are instantly in employment: they fit out their boats, and row away to where the whale was seen. The harpooner, who is to strike the fish, stands at the prow of the boat, with a harpoon or javelin in his hand, five or six feet long, pointed with steel like the barb of an arrow, of a triangular shape. As this person's place is that of the greatest dexterity, so also it is of the greatest danger: the whale sometimes overturns the boat with a blow of its tail, and sometimes drives against it with fury. In general, however, the animal seems to sleep on the surface of the water; while the boat approaching, the harpooner stands aloft, and, with his harpoon tied to a cord of several hundred fathoms' length, darts it into the animal, and then rows as fast as possible away. It is sometime before the whale seems to feel the blow; the instrument has usually pierced no deeper than the fat, and that being insensible, the animal continues for awhile motionless; but soon roused from its seeming lethargy, as the shaft continues to pierce deeper and deeper into the muscular flesh, it flies off with amazing rapidity. In the mean time, the harpoon sticks in its side; while the rope, which is coiled up in the boat, and runs upon a swivel, lengthens as the whale recedes, but still shows the part of the deep to which it has retreated. The cord is coiled up with great care; for such is the rapidity with which it runs off, that if it was but the least checked, as it yields with the animal's retreat, it would infallibly overset the boat, and the crew would go to the bottom. It sometimes happens also, that the rapidity with which it runs over the swivel at the edge of the boat, heats it, and it would infallibly take fire, did not a man stand continually with a wet mop in his hand, to cool the swivel as the cord runs. The whale having dived to a considerable depth, remains at the bottom, sometimes for near half an hour, with the harpoon in its body, and then rises to take breath, expecting the danger over: but the instant it appears, they are all with their boats ready to receive it, and fling their harpoons into its body: the animal again dives and again rises, while they repeat their blows. The ship follows in full sail, like all the rest, never losing sight of the boats, and ready to lend them assistance; the whole ocean seems dyed in blood. Thus they renew their attack, till the whale begins to be quite enfeebled and spent, when they plunge their longer spears into various parts of its body, and the enormous animal expires. When it is dead, to prevent it from sinking, they tie it with a strong iron chain to the side of the boat, and either cut it up in pieces, and carry it home in that manner, or extract the oil from the blubber on ship-board.*

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* Whale Fishing — The first object is to fit out a ship suited to the trade. While the fishery was carried on in bays, or on the exterior margin of icy fields, very slight fabrics were sufficient; but now that the vessels depart early in the season, and push into the very heart of the northern ices, they are liable every moment to the most severe shocks and concussions. The ship, therefore, must be constructed in such a manner, as to possess a peculiar degree of strength. Its exposed parts is secured with double and even treble timbers, while it is fortified, as the expression is, externally with iron plates, and internally with stanchions and cross-bars, so disposed as to cause the pressure on any one part to bear upon and be supported by the whole fabric. Mr. Scoresby recommends the dimension of 350 tons as the most eligible. A ship of this size is sometimes filled, and the number of men required for its navigation, being also necessary for manning the boats employed in the fishery, could not be reduced even in a much smaller vessel. A larger tonnage than 350, being scarcely ever filled, involves the proprietor in useless extra expense. The Dutch are of opinion, that the vessels destined for this fishery should be 112 feet long, 29 broad, and 12 deep, carrying seven boats, and from 40 to 50 seamen.

The Whaling vessels usually take their departure in such time as to leave the Shetland Isles about the beginning of April; and before the end of the month, arrive within the Polar seas It was long customary to spend a few weeks at what is called the Seal fisher's Bight, extending along the coast of Greenland, ere they pushed into those more northern waters; where, amid fields and mountains of ice, the powerful and precious mysticetus is tossing; but in later times it has become usual to sail at once into that centre of danger and enterprise.—Edinburgh Cabinet Library.

Such is the manner in which these fish were taken in the beginning; but succeeding arts have improved the method, and the harpoon is now thrown by : a machine being used which inflicts a deeper wound, and strikes the animal with much greater certainty: there are better methods for extracting the oil, and properer machines for cutting the animal up, than were used in the early fisheries. The flesh of this animal is also a dainty to some nations; and even the French seamen are now and then found to dress and use it as their ordinary diet at sea. It is said, by the English and Dutch sailors, to be hard and ill-tasted; but the French assert the contrary; and the savages of Greenland, as well as those near the south pole, are fond of it to distraction. They eat the flesh, and drink the oil, which is a first-rate delicacy. The finding a dead whale is an adventure considered among the fortunate circumstances of their wretched lives. They make their abode beside it: and seldom remove till they have left nothing but the bones.†

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* The Death.—When the whale is first struck and plunges into the waves, the boat's crew elevate a flag as a signal to the watch on deck, who give the alarm to those asleep below by stamping violently on the deck, and crying aloud—"*A fall, A fall!*" (Dutch, *val*, expressing the precipitate haste with which the sailors throw themselves into the boats.) On this notice they do not allow themselves time to dress, but rush out in their sleeping shirts or drawers into an atmosphere, the temperature of which is often below zero, carrying along with them their clothing in a bundle, and trusting to make their toilette in the interval of manning and pushing off the boats. Such is the tumult at this moment, that young mariners have been known to raise cries of fear, thinking the ship was going down.

The period during which a wounded whale remains under water is various, but is averaged by Mr. Scoresby at about half an hour. Then, pressed by the necessity of respiration, he appears above, often considerably distant from the spot where he has been harpooned, and in a state of great exhaustion, which the same ingenious writer ascribes to the severe pressure that he has endured when placed beneath a column of water 700 or 800 fathoms deep. All the boats have meantime been spreading themselves in various directions, that one at least may be within a *start*, as it is called, or about 200 yards of the point of his rising, at which distance they can easily reach and pierce him with one or two more harpoons before he again descends, as he usually does for a few minutes. On his reappearance, a general attack is made with lances, which are struck as deep as possible, to reach and penetrate the vital parts. Blood mixed with oil streams copiously from his wounds, and from the blow-holes, dyeing the sea to a great distance, and sprinkling and sometimes drenching the boats and crews. The animal now becomes more and more exhausted; but at the approach of his dissolution, he often makes a convulsive and energetic struggle, rearing his tail high in the air, and whirling it with a noise which is heard at the distance of several miles. At length, quite overpowered and exhausted, he lays himself on his side or back, and expires. The flag is then taken down, and three loud huzzas raised from the surrounding boats. No time is lost in piercing the tail with two holes, through which ropes are passed, which being fastened to the boats, drag the fish to the vessel amid shouts of joy.—Edin. Cabinet Library.

† Gigantic Whale.—The Skeleton of an immense specimen of the Greenland Whale (*Balæna Mysticetus*) was recently exhibited in a Pavilion erected upon the area of the King's Mews, Charing Cross, London. The entire animal was found dead, floating off the coast of Belgium, about twelve miles distant from Ostend, Nov. 3, 1827, by a crew of fishermen. Their boat being of too weak tonnage and sail to move so enormous a mass, they hailed two other boats to their assistance; and the three towed the whale towards Ostend Harbour: on entering which, the cable with which it was fastened to the boats broke, and it was cast on the sands east of the harbour, where the preparatory operations of dissecting, cleaning, &c. were effected.

Cuvier, and the Professors of the *Jardin des Plantes* at Paris, estimate this enormous animal to have lived from nine hundred to one thousand years; and one proof of its great age is in the cartilages of the fingers of the *hands*, or side fins, which are perfectly ossified, or converted into bone.

At Ostend, this wonder of the deep created what journalists call a sensation among all ranks of the people; and our gay neighbours made its capture the occasion of three days *fetes*, with a host of allegorical and processional accompaniments, which are detailed in a *Memoir pour servir* of the whole affair. The Proprietors next visited Paris, and there pitched their pavilion in *Place Louis XV.*, where the skeleton was inspected by all the *savans* as well as the sight-loving persons of the capital. Thence they journeyed to London, where the exhibition received all the encouragement it merited.

The skeleton as our Engraving shows, is ingeniously supported upon iron-work. The bones are bound or cemented together, and the appearance of the whole is unique. The breast-fins, or *hands*, as they are properly called, can scarcely fail to attract the notice of the most listless visiter. The upper jaw was provided with eight hundred pieces of baleen, improperly termed *whalebone*. The brain, a model of which is exhibited, appears extraordinarily small.

There is an interesting fact connected with the food of the above species, or the Greenland Whale. They abound in the olive waters of the Greenland sea, on account of the incalculable number of the animalculæ, or medusæ, which occupy about a fourth of that sea, or about 20,000 square miles. The whales cannot derive any direct subsistence from the animalculæ, but these form the food of other minute creatures, which then support others, till at length animals are produced of such size as to afford a morsel for their mighty devourers.

Mr Scoresby estimates that two square miles of these waters contain 23,888,000,000,000,000 animalculæ; and, as this number is beyond the range of human words and conceptions, he illustrates it by observing that 80,000 persons would have been employed since the creation in counting it.

A single glance at this stupendous skeleton will convince the reader of the vulgar error of terming the whale a fish. Upon this distinction, we find the following judicious observations in a recent work. Speaking of *Cetacea*, to which class of animals whales belong, the writer says:—'Although their home be entirely in the depth of the waters, they have several features in common with the larger quadrupeds. They belong to the Linnæan class of *mammalia*, or suck-giving animals; they produce their young alive; their skin is smooth, and without scales; their blood warm, and the flesh tastes somewhat like coarse beef. They have a heart with two ventricles, and lungs through which they respire; and being unable to separate the air from the water as fishes do, by means of their gills: they must come to the surface in order to breathe. *It is thus by no means strictly scientific to call the whale a fish*; yet he is entirely an inhabitant of the sea, having a tail, though placed in a different position from that of ordinary fishes, while his front limbs much more resemble fins than legs, and are solely used for pawing the deep. Hence the vulgar, following a natural and descriptive classification, obstinately continue to give the name of fish to these watery monsters.

JONAH'S WHALE.—The narrative of Jonah's extraordinary preservation from death, when thrown overboard by the terrified mariners, has furnished ample materials for the cavils of the infidel, and for the speculation of the philosopher and the critic. In the sacred text, the particular fish which was rendered the preserver of the disobedient prophet, is not specified; although the Septuagint translators have inserted the whale, and the Evangelists, in recording our Saviour's words relative to the event and its typical character, have used the same word. It by no means follows from this, however, that the writers of the gospel designed to give their sanction to this interpretation; the LXX being the version in common use among their countrymen, they quoted it without alteration where its deviations from the original involved no serious consequences. Although the whale is the largest of all known fish, its gullet is too small to permit the passage of a human body through it; and therefore we cannot, without the supposition of an additional miracle, admit this to be the fish intended. Bochart and Linnæus suppose it to have been the charcharias, or lamia, which has a throat and body so prodigiously great, that it can easily swallow a man without the least hurt.

Our Lord observes (Luke xi 30.) that "Jonah's was a sign to the Ninevites;" and it is remarkable that the event should have been so widely spread, and attracted so much notice, that among the few fragments of antiquity remaining to us, this little history should receive from them larger confirmation than some others of greater extent and magnitude. The heathen have preserved the fact, but applied it to Hercules:

> That fam'd three nighted lion, whom of old,
> Triton's charcharian dog, with horrid jaws devour'd.
>
> LYCOPHRON.

Æneas Gazaeus, recording the same event, which he also refers to Hercules, employs the very term Ketos adopted by the LXX, and

CHAP. IV.

THE NARWHAL.

From whales that entirely want teeth, we come to such as have them in the upper jaw only; and in this class there is found but one, the Narwhal, or Sea-unicorn. This fish is not so large as the whale, not being above sixty feet long. Its body is slenderer than that of the whale, and its fat not in so great abundance. But this great animal is sufficiently distinguished from all others of the deep by its tooth or teeth, which stand pointing directly forward from the upper jaw, and are from nine to fourteen feet long. In all the variety of weapons with which Nature has armed her various tribes, there is not one so large or so formidable as this. This terrible weapon is generally found single: and some are of opinion that the animal is furnished but with one by nature; but there is at present the skull of a narwhal at the Stadthouse at Amsterdam with two teeth; which plainly proves that in some animals, at least, this instrument is double. In a skull to be seen at Hamburgh there are two teeth, which are each above seven feet long, and are eight inches in circumference. When the animal possessed of these formidable weapons is urged to employ them, it drives directly forward against the enemy with its teeth, that, like protended spears, pierce whatever stands before them.

The extreme length of these instruments have induced some to consider them rather as horns than teeth; but they in every respect resemble the tusks of the boar and the elephant. They grow, as in them, from sockets in the upper jaw; they have the solidity of the hardest bone, and far surpass ivory in all its qualities.

Yet, notwithstanding all these appointments for combat, these long and pointed tusks, amazing strength, and unmatchable celerity, the narwhal is one of the most harmless and peaceful inhabitants of the ocean. It is seen constantly and inoffensively sporting among the other great monsters of the deep, no way attempting to injure them, but pleased in their company. The Greenlanders call the narwhal the fore-runner of the whale; for wherever it is seen, the whale is shortly after sure to follow.

The manners and appetites both of the narwhal and the great whale are entirely similar; they both alike want teeth for chewing, and are obliged to live upon insects; they both are peaceable and harmless, and always rather fly than seek the combat. The narwhal, however, has a much narrower gape than the great whale, and therefore does not want the use of barbs to keep in its food

by Matthew: "As Hercules is also reported, when he was shipwrecked, to have been swallowed by a (ketos) whale (or great fish): and yet to have been saved.'' That Hercules should have been substituted for Jonah, can excite no just astonishment, since Tacitus himself acknowledges, that, to advance the fame of this distinguished favourite, they do not hesitate to ascribe to him whatever is extraordinary or noble in history, to whomsoever the real praise is due. They plunder every other celebrated character, of whatever country, of all his merit, to adorn their fabled hero with the spoils stolen from truth, and honestly belonging to others.

The late editor of Calmet in a series of dissertations, more ingenious than solid, has laboured to prove that instead of a living animal, a floating preserver is intended by the sacred writer. According to his principles of interpretation, the passage will read thus: "The Lord prepared a large Dag (preserver) to receive Jonah; and Jonah was in the inner part (the belly or hold) of this Dagah, three days and nights, and then was cast upon the shore." "To this," he observes, "our Lord adverts in Matth. xii. 40 Jonah was in the hollow cavity of the ketos, three days and nights (in the heart of the sea, says Jonah); so shall the Son of Man be in the heart of the earth."

Scripture Natural History.

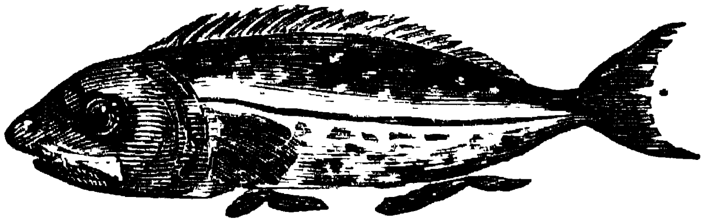
when once sucked into the mouth. It is also much swifter, and would never be taken by the fisherman but for those very tusks, which at first appear to be its principal defence. These animals, as was said, being fond of living together, are always seen in herds of several at a time; and whenever they are attacked, they crowd together in such a manner, that they are mutually embarrassed by their tusks. By these they are often locked together, and are prevented from sinking to the bottom. It seldom happens, therefore, but the fishermen make sure of one or two of the hindmost, which very well reward their trouble.

It is from the extraordinary circumstance of the teeth, therefore, that this fish demands a distinct history; and such has been the curiosity of mankind, and their desire to procure them, that a century ago they were considered as the greatest rarity in the world. At that time the art of catching whales was not known; and mankind saw few, except such as were stranded on the coasts by accident. The tooth of the narwhal, therefore, was ascribed to a very different animal from that which really bore it. Among other fossil substances they were sometimes dug up; and the narwhal being utterly unknown, naturalists soon found a terrestrial owner. They were thought to be the horns of unicorns—an animal described by Pliny as resembling a horse, and with one straight horn darting forward from the middle of its forehead. These teeth were, therefore, considered as a strong testimony in favour of that historian's veracity, and were shown among the most precious remains of antiquity. Even for some time after the narwhal was known the deceit was continued, as those who were possessed of a tooth sold it to great advantage. But at present they are too well known to deceive any, and are only shown for what they really are; their curiosity increasing in proportion to their weight and their size.

CHAP. V.

THE DOLPHIN, THE GRAMPUS, AND THE PORPOISE, WITH THEIR VARIETIES.

All these fish have teeth both in the upper and the lower jaw, and are much less than the whale. The Grampus, which is the largest, never exceeds twenty feet.* It may also be distinguished by the flatness of its head, which resembles



(The Dolphin.)

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* The Gladiator, or Sea-sword, a formidable enemy to the Greenland whale, has often been confounded with the grampus. The grampus has the top of the head rather flat, the snout less obtuse, the upper jaw longer than the lower, while in the gladiator both are of equal length. The teeth of the grampus are blunt; and the dorsal fin placed about the middle of the back, and proportionably not so long as in the gladiator. Indeed, it is from the remarkable length and firmness of this fin in the gladiator that it has received the name of sea-sword.

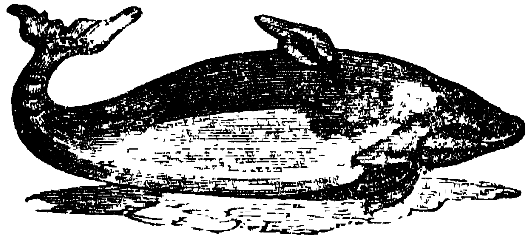
a boat turned upside down. The Porpoise resembles the grampus in most things, except the snout, which is not above eight feet long; its snout, also, more resembles that of a hog. The Dolphin has a strong resemblance to the porpoise, except that its snout is longer and more pointed. They have all fins on the back; they all have heads very large, like the rest of the whale kind; and resemble each other in their appetites, their manners, and conformations; being equally voracious, active and roving.

The great agility of these animals prevents their often being taken. They seldom remain a moment above water; sometimes, indeed, their too eager pursuits expose them to danger; and a shoal of herrings often allures them out of their depth. In such a case, the hungry animal continues to flounder in the shallows till knocked on the head, or till the retiring tide seasonably comes to its relief. But all this tribe, and the dolphin in particular, are not less swift than destructive. No fish could escape them, but from the awkward position of the mouth, which is placed in a manner under the head; yet, even with these disadvantages, their depredations are so great that they have been justly styled the plunderers of the deep.

What could induce the ancients to a predilection in favour of these animals, particularly the dolphin, it is not easy to account for.* Historians and philosophers seem to have contended who should invent the greatest number of fables concerning them. The dolphin was celebrated in the earliest time for its fondness to the human race, and was distinguished by the epithets of the boy-loving and philanthropist. Scarce an accident could happen at sea but the dolphin offered himself to convey the unfortunate to shore. The musician flung into the sea by pirates, the boy taking an airing into the midst of the sea, and returning again in safety, were obliged to the dolphin for its services. It is not easy, I say, to assign a cause why the ancients should thus have invented so many fables in its favour.

The moderns have more just notions of these animals; and have got over the many fables which every day's experience contradicts. Indeed, their numbers are so great, and, though shy, they are so often taken, that such peculiarities, if they were possessed of any, would have been long since ascertained. They are found, the porpoise especially, in such vast numbers, in all parts of the sea that surrounds this kingdom, that they are sometimes noxious to seamen when they sail in small vessels. In some places they almost darken the water as they rise to take breath; and particularly before bad weather, are much agitated, swimming against the wind, and tumbling about with unusual violence.

It sometimes happens that the impetuosity or the hunger of these animals, in their usual pursuits, urges them beyond the limits of safety.† The fishermen, who extend their long nets for pilchards, on the coasts of Cornwall, have sometimes an unwelcome capture in one of these. Their feeble nets, which are calculated only for taking smaller prey, suffer an universal laceration from the efforts of this strong animal to escape; and if it be not knocked on the head, before it has had time to flounder, the nets


(The Porpoise.)

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* The Dolphin was, even so late as the reign of Queen Elizabeth, reckoned a great delicacy. Doctor Caius says, that one, which was taken in his time, was thought a present worthy the Duke of Norfolk, who distributed part of it amongst his friends. It was roasted and dressed with porpoise sauce, made of crumbs of fine white bread, mixed with vinegar and sugar.

† Sea Hogs.—During a scarcity of fish, porpoises are said to dive to the bottom, and grope, like hogs, among the sand, for sand-eels and sea-worms. Hence in most languages, they receive the foregoing name. Porpoise has that signification in Italian. The ardour of their pursuit is such that porpoises are frequently taken as far up the river Thames as Westminster Bridge.—Ed.

are destroyed, and the fishery interrupted. There is nothing, therefore, they so much dread as the entangling a porpoise; and they do everything to intimidate the animal from approaching.

When the porpoise is taken, it becomes no inconsiderable capture, as it yields a very large quantity of oil; and the lean of some, particularly if the animal be young, is said to be as well tasted as veal.

As for the rest, we are told that these animals go with young ten months;—that, like the whale, they seldom bring forth above one at a time, and that in the midst of summer: that they live to a considerable age, though some say not above twenty-five or thirty years; and they sleep with the snout above water. They seem to possess, in a degree proportioned to their bulk, the manners of whales; and the history of one species of cetaceous animals will, in a great measure, serve for all the rest.

CHAP. I.

CARTILAGINOUS FISHES IN GENERAL.

We have seen that fishes of the cetaceous kind bear a strong resemblance to quadrupeds in their conformation: those of the cartilaginous kinds are one remove separated from them; they form the shade that completes the imperceptible gradations of nature.

The first great distinction they exhibit is in having cartilages, or gristles, instead of bones. The cetaceous tribes have their bones entirely resembling those of quadrupeds, thick, white, and filled with marrow: those of the spinous kind, on the contrary, have small, slender bones, with points resembling thorns, and generally solid throughout. Fishes of the cartilaginous kinds have their bones always soft and yielding; and age, that hardens the bones of other animals, rather contributes still more to soften theirs.

They have other differences more obviously discernible. We have observed that the cetaceous tribes had lungs like quadrupeds, a heart with its partition in the same manner, and an apparatus for hearing: on the other hand, we mentioned that the spinous kinds had no organs of hearing, no lungs to breathe through, and no partition in the heart; but that their cold, red blood was circulated by the means of the impulse made upon their gills by the water. Cartilaginous fishes unite both these systems in their conformation; like the cetaceous tribes, they have organs of hearing and lungs; like the spinous kinds, they have gills and a heart without a partition. Thus possessed of a twofold power of breathing, sometimes by means of their lungs, sometimes by that of their gills, they seem to unite all the advantages of which their situation is capable, and drawing from both elements every aid to their necessities or their enjoyments.

We observed, in a former chapter, that spinous fishes have not, or, at least, appear not to have, externally any instruments of generation. It is very different with those of the cartilaginous kind, for the male always has these instruments double. The fish of this tribe are not unfrequently seen to copulate; and their manner is belly to belly, such as may naturally be expected from animals whose parts of generation are placed forward. They in general choose colder seasons and situations than other fish for propagating their kind; and many of them bring forth in the midst of winter.

Such are the peculiar marks of the cartilaginous class of fishes, of which there are many kinds. To give a distinct description of every fish is as little my intention, as, perhaps, it is the wish of the reader; but the peculiarities of each kind deserve notice, and the most striking of these it would be unpardonable to omit.

Cartilaginous fish may be divided, first, into those of the shark kind, with a body growing less towards the tail, a rough skin, with the mouth placed far beneath the end of the nose, five apertures on the sides of the neck for breathing, and the upper part of the tail longer than the lower. This class chiefly comprehends the Great White Shark, the Balance Fish, the Hound Fish, the Monk Fish, the Dog Fish, the Basking Shark, the Zygæna, the Tope, the Cat Fish, the Blue Shark, the Sea Fox, the Smooth Hound Fish, and the Porbeagle. These are all of the same nature, and differ more in size than in figure or conformation.

The next division is that of flat fish; and these their broad, flat, thin shape is sufficiently capable of distinguishing from all others of this kind. They may be easily distinguished, also, from spinous flat fish by the holes through which they breathe, which are uncovered by a bone; and which, in this kind, are five on each side. In this tribe we may place the Torpedo, the Skate, the Sharp-nosed Ray, the Rough Ray, the Thornback, and the Fire Flare.

The third division is that of the slender snake-shaped kind: such as the Lamprey, the Pride, and the Pipe Fish.

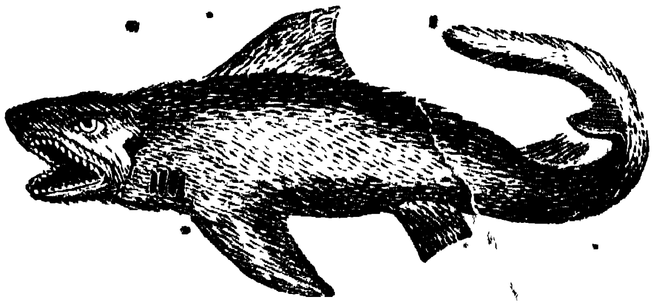
The fourth division is of the sturgeon and its variety, the Isinglass Fish.

The last division may comprise fish of different figures and natures, that do not rank under the former divisions. These are the Sun Fish, the Tetrodon, the Lump Fish, the Sea Snail, the Chimæra, and the Fishing Frog. Each of these has somewhat peculiar in its powers or its form that deserves to be remarked. The description of the figures of these, at least, may compensate for our general ignorance of the rest of their history.

CHAP. II.

CARTILAGINOUS FISHES OF THE SHARK KIND.

Of all the inhabitants of the deep, those of the shark kind are the fiercest and the most voracious.



(The Shark.)

The Great White Shark is sometimes seen to rank even among whales for magnitude; and is found from twenty to thirty feet long. Some assert that they have seen them of four thousand pounds weight; and we are told particularly of one that had a human corpse in his belly. The head is large and somewhat flatted; the snout long, and the eyes large. The mouth is enormously wide; as is the throat, and capable of swallowing a man with great ease. But its furniture of teeth is still more terrible: of these there are six rows, extremely hard, sharp-pointed, and of a wedge-like figure. It is asserted that there are seventy-two in each jaw, which make one hundred and forty-four in the whole; yet others think that their number is uncertain, and that, in proportion as the animal grows older, these terrible instruments of destruction are found to increase. With these the jaws, both above and below, appear planted all over; but the animal has a power of erecting or depressing them at pleasure. When the shark is at rest, they lie quite flat in his mouth; but when he prepares to seize his prey, he erects all this dreadful apparatus, by the help of a set of muscles that join them to the jaw and the animal he seizes, dies, pierced with a hundred wounds in a moment.

Nor is this fish less terrible to behold as to the rest of his form: his fins are larger in proportion; he is furnished with great, goggle eyes, that he turns with ease on every side, so as to see his prey behind him as well as before; and his whole aspect is marked with a character of malignity: his skin, also, is rough, hard, and prickly; being that substance which covers instrument cases, called shagreen.

As the shark is thus formidable in his appearance, so is he also dreadful from his courage and activity. No fish can swim so fast as he; none so constantly employed in swimming, he outstrips the swiftest ships, plays round them, darts out before them, returns, seems to gaze at the passengers, and all the while does not seem to exhibit the smallest symptom of an effort to proceed. Such amazing powers, with such great appetites for destruction would quickly unpeople even the ocean; but, providentially, the shark's upper jaw projects so far above the lower, that he is obliged to turn on one side (not on his back, as is generally supposed) to seize his prey. As this takes some small time to perform, the animal pursued seizes that opportunity to make its escape.

Still, however, the depredations he commits are frequent and formidable. The shark is the dread of sailors in all hot climates;—where, like a greedy robber, he attends the ships, in expectation of what may drop overboard. A man who unfortunately falls into the sea at such a time, is sure to perish without mercy. A sailor that was bathing in the Mediterranean, near Antibes, in the year 1744, while he was swimming about fifty yards from the ship, perceived a monstrous fish making towards him and surveying him on every side, as fish are often seen to look round a bait. The poor man, struck with terror at its approach, cried out to his companions in the vessel to take him on board. They accordingly threw him a rope with the utmost expedition, and were drawing him up by the ship's side, when the shark darted after him from the deep, and snapt off his leg.*

Such is the frightful rapacity of this animal; nothing that has life is rejected. But it seems to have a peculiar enmity to man: when once it has tasted human flesh, it never desists from haunting those places where it expects the return of its prey.† It is even asserted, that, along the coasts of Africa, where these animals are found in great abundance, numbers of the Negroes, who are obliged to frequent the waters, are seized and devoured by them every year. The people of these coasts are firmly of opinion that the shark loves the black man's flesh in preference to the white; and that, when men of different colours are in the water together, it always makes choice of the former.

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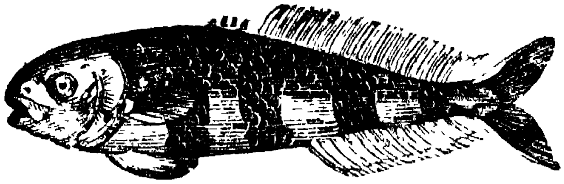
* Anecdote.—A singular circumstance occurred, in February, 1824, at St. Vincent, in Jamaica. A gentleman, named Whitlow, sailing in a boat at night from the leeward port of Kingston, and sitting in the stern sheets, a large shark, that had followed, made at length a spring at his intended victim, knocked off his hat, but at the same time fell into the boat. The gentleman, with great presence of mind, immediately jumped up, and secured the voracious monster with a cloak and some bandages. It measured twelve feet.

† Escape from a Shark.—The Placez de la Piedra Negada, which is near Loreto, was supposed to have quantities of very large pearl oysters round it—a supposition which was at once confirmed by the great difficulty of finding the sunken rock. Don Pablo, however, succeeded in sounding it; and, in search of specimens of the largest and oldest shells, dived down in eleven fathoms water. The rock is not above one hundred and fifty or two hundred yards in circumference; and our adventurer swam round and examined it in all directions, but without meeting any inducement to prolong his stay. Accordingly, being satisfied that there were no oysters, he thought of ascending to the surface of the water; but, first, he cast a look upwards, as all divers are obliged to do, who hope to avoid the hungry jaws of a monster. If the coast is clear, they may rise without apprehension. Don Pablo, however, when he cast a hasty glance upwards, found that a tinterero had taken a station about three or four yards immediately above him, and, most probably, had been watching during the whole time that he had been down. A double-pointed stick is a useless weapon against a tinterero, as its mouth is of such enormous dimensions that both man and stick would be swallowed together. He, therefore, felt himself rather nervous, as his retreat was now completely intercepted.



(The Pilot Fish.)

Man alone is not the only enemy this fish has to fear: the Remora, or Sucking Fish, is probably a still greater, and follows the shark every where. This fish has got a power of adhering to whatever it sticks against, in the same manner as a cupping-glass sticks to the human body. It is by such an apparatus that this animal sticks to the shark, and drains away its moisture. The seamen, however, are of opinion that it is seen to attend on the shark for more friendly purposes, to point him to his prey, and to apprise him of his danger. For this reason it has been called the Shark's Pilot.*

But, under water, time is too great an object to be spent in reflection; and, therefore, he swam round to another part of the rock, hoping by this means to avoid the vigilance of his persecutor. What was his dismay, when he again looked up, to find the pertinacious tinterero still hovering over him, as a hawk would follow a bird. He described him as having large, round, and inflamed eyes, apparently just ready to dart from their sockets with eagerness, and a mouth (at the recollection of which he still shuddered) that was continually opening and shutting, as if the monster was already, in imagination, devouring his victim, or, at least, that the contemplation of his prey imparted a foretaste of the *gout!* Two alternatives now presented themselves to the mind of Don Pablo.—one, to suffer himself to be drowned, the other, to be eaten. He had already been under water so considerable a time that he found it impossible any longer to retain his breath, and was on the point of giving himself up for lost with as much philosophy as he possessed. But what is dearer than life? The invention of man is seldom at a loss to find expedients for its preservation in cases of great extremity. On a sudden, he recollected that on one side of the rock he had observed a sandy spot, and to this he swam with all imaginable speed; his attentive friend still watching his movements, and keeping a measured pace with him. As soon as he reached the spot, he commenced stirring it with his pointed stick, in such a way that the fine particles rose, and rendered the water perfectly turbid, so that he could not see the monster, nor the monster him. Availing himself of the *cloud* by which the tinterero and himself were enveloped, he swam very far out in a transvertical direction, and reached the surface in safety, though completely exhausted. Fortunately he rose close to one of the boats; and those who were within, seeing him in such a state, and knowing that an enemy must have been persecuting him, jumped overboard, and by splashing the water, frightened the creature away, and Don Pablo was taken into the boat more dead than alive.—HARDY'S TRAVELS IN MEXICO.

* THE SHARK'S PILOT.—In the month of May, 1798, Citizen Geoffry found himself between Cape Bon and the island of Malta, where, much fatigued with the long continuance of a calm the attention of all the passengers was excited by a shark advancing towards the vessel. The two pilots which preceded him were seen to direct their course to the poop of the vessel, which they inspected twice, from one end to the other; but finding that there was nothing which they might turn to their advantage, they resumed their former route; the shark never lost sight of his friends, but followed as if he had been dragged by them. As soon as he was descried, one of the sailors threw a large hook into the sea, baited with lard. The three travellers, though they had already proceeded to the distance of twenty or twenty-five millemetres, hearing the noise occasioned by the fall of the bait, stopped short, and the two pilots detached themselves to examine the vessel. The shark, during their absence, sported on the surface of the water, turned himself on his back, and dived, but always reappeared at the same place. The pilots had no sooner discovered the lard, than they returned to their master with great velocity, made every effort to get before him, and then suddenly returned in the direction of the vessel. They were followed by the shark, who appeared not to discover the lard till the moment it was pointed out to him by his guides: it was then only that he began to swim with greater velocity, or, rather, made a jump to seize it, when the hook penetrated

The shark so much resembles the whale in size, that some have injudiciously ranked it in the class of cetaceous fishes; but its real rank is in the place here assigned it, among those of the cartilaginous kind. It breathes with gills and lungs, its bones are gristly, and it brings forth several living young: Belonius assures us, that he saw a female shark produce eleven live young ones at a time.*

Upon the whole, a shark, when living, is a very formidable animal; and, when dead, is of very little value. The flesh is hardly digestible by any but the Negroes, who are fond of it to distraction; the liver affords three or four quarts of oil; some imaginary virtues have been ascribed to the brain; and its skin is, by great labour, polished into that substance called shagreen.

CHAP. III.

CARTILAGINOUS FLAT-FISH, OR THE RAY KIND.

The same rapacity which impels the shark along the surface of the water actuates the flat fish at the bottom. Less active and less formidable, they creep in security along the bottom, seize everything that comes in their way; neither the hardest shells nor the sharpest spines give protection to the animals that bear them: their insatiable hunger is such that they devour all; and the force of their stomach is so great that it easily digests them.

All fish of the ray kind are broad, cartilaginous, swimming flat on the water, and having spines on different parts of their body, or at the tail. They all have their eyes and mouth placed quite under the body, with apertures for breathing either about or near them. They all have teeth, or a rough bone, which answers the same purpose. Their bowels are very wide towards the mouth, and go on diminishing to the tail. The tail is very differently shaped from that of other fishes, and at first sight more resembling that of a quadruped, being narrow, and ending either in a bunch or a point. But what they are chiefly distinguished by, is their spines or prickles, which the different species have on different parts of their body.

It is by the spines that these animals are distinguished from each other. The skate has the middle of the back rough, and a single row of spines on the tail.†

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his lip, and he was immediately hoisted on board. It would be interesting to inquire into the causes of this singular association, and to find out whether, as has been asserted, it is the dung of the shark that allures the pilot fish.

* Reproduction.—Sharks, as well as the Ray tribe, bring forth their young alive, more than one at a time, and each inclosed in a square, horny case, terminated at the four corners by slender filaments. After being in the water some time, these natural pouches open at one end, and the young fish escapes from its confinement. These receptacles are, in the shark, of a pellucid horn colour, terminated at the corners by very long, slender filaments, which are generally found twisted round coral, sea-weeds, and other substances, to prevent their being driven on shore before their young is excluded: those of the ray tribe are black, with the filaments longer than the case, and are frequently cast on our shores in great abundance.

† Skates.—These fishes generate in March and April, at which time they swim near the surface of the water, several of the males pursuing one female; and adhere so fast during coition, that the fishermen frequently draw up both together, though only one has taken the bait. The females begin to cast their *purses*, as the fishermen call them (the bags in which the young are included), in May, and continue doing so till September. In October they are exceedingly poor and thin,

The sharp-nosed ray has ten spines that are situated towards the middle of the back. The rough ray has its spines spread indiscriminately over the whole back. The thornback has its spines disposed in three rows upon the back. The fire-flare has but one spine, but that indeed a terrible one. This dangerous weapon is placed on the tail, about four inches from the body, and is not less than five inches long. It is of a flinty hardness; the sides thin, sharp-pointed, and closely and sharply bearded the whole way. The last of this tribe that I shall mention is the torpedo; and this animal has no spines that can wound; but in the place of them it is possessed of one of the most potent and extraordinary faculties in nature.

Of all the larger fish of the sea, these are the most numerous; and they owe their numbers to their size. Except the white shark and cachalot alone, there is no other fish that has a swallow large enough to take them in; and their spines make them a still more dangerous morsel. Yet the size of some is such that even the shark himself is unable to devour them: we have seen some of them in England weigh above two hundred pounds; but that is nothing to their enormous bulk in other parts of the world.*

Yet, large as this may seem, it is very probable that we have seen only the smallest of the kind; as they generally keep at the bottom, the largest of the kind are seldom seen; and, as they may probably have been growing for ages, the extent of their magnitude is unknown.

The ray generally chooses for its retreat such parts of the sea as have a black, muddy bottom; the large ones keep at greater depths, but the smaller approach the shores, and feed upon whatever living animals they can surprise, or whatever putrid substances they meet with. As they are ravenous, they easily take the bait, yet will not touch it if it be taken up and kept a day or two out of water.

The skate and the thornback are very good food; and their size, which is from ten pounds to two hundred weight, very well rewards the trouble of fishing for them. But it sometimes happens that the fisherman's lines are visited by very unwelcome intruders; by the rough ray, the fire-flare, or the torpedo. To all these the fishermen have the most mortal antipathy; and, when discovered, shudder at the sight: however, they are not always so much upon their guard, but that they sometimes feel the different resentments of this angry tribe; and instead of a prize, find they have caught a vindictive enemy. When such is the case, they take care to throw them back into the sea with the swiftest expedition.

The rough ray is harmless, when compared to the fire-flare, which seems to be the dread of even the boldest and most experienced fishermen. The weapon with which Nature has armed this animal, which grows from the tail, and which we described as barbed and five inches long, hath been an instrument of terror to the ancient fishermen as well as the moderns: and they have delivered many tremendous fables of its astonishing effects. Pliny, Ælian, and Oppian, have

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but in November they begin to improve, and grow gradually better till May, when they are in the highest perfection. The males go sooner out of season than the females.

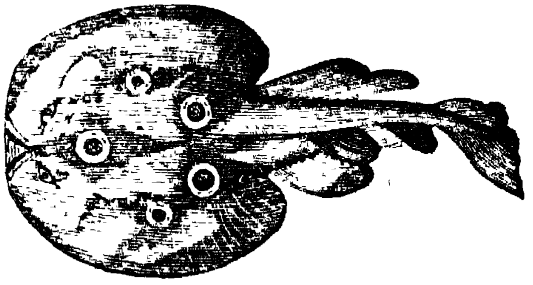
* Sharp-nosed Ray.—In fishing in the Menai, July, 1768, we took one of this species, says Pennant, whose length was nearly seven feet, and breadth five feet two inches; when just brought on shore, it made a remarkable snorting noise. The fish has been supposed to be the *Bos* of the ancients, which was certainly some enormous species of ray, though we cannot pretend to determine the particular kind: *Oppian* styles it

"Broadest among fishes."

He adds an account of its fondness for human flesh, and the method it takes of destroying men by overlaying and keeping them down by its vast weight till they are drowned. Philo gives much the same relation. We are inclined to give them credit, since a modern writer, of undoubted authority, Ulloa, gives the very same account of a fish found in the South Seas, the terror of those employed in the pearl fishery. It is a species of ray, called there Manta, or the Quilt, from its surrounding and wrapping up the unhappy divers till they are suffocated; therefore, the negroes never go down without a sharp knife to defend themselves against the assaults of this terrible enemy.—Ulloa's Voyages.

supplied it with a venom that affects even the inanimate creation; trees that are struck by it, instantly lose their verdure; and rocks themselves are incapable of resisting the potent poison. The enchantress Circe armed her son with a spear headed with the spine of the trygon, as the most irresistible weapon she could furnish him with; a weapon that soon after was to be the death of his own father.

That spears and darts, says Mr. Pennant, might in very early times have been headed with this bone instead of iron, we have no doubt. The Americans head their arrows with the bones of fishes to this day; and, from their hardness and sharpness, they are no contemptible weapons. But that this spine is possessed of those venomous qualities ascribed to it, we have every reason to doubt; though some men of high reputation, and the whole body of fishermen, contend for its venomous effects. It is, in fact, a weapon of offence belonging to this animal, and capable, from its barbs, of inflicting a very terrible wound, attended with dangerous symptoms: but it cannot be possessed of any poison, as the spine has no sheath to preserve the supposed venom on its surface; and the animal has no gland that separates the noxious fluid: besides, all those animals that are furnished with envenomed fangs or stings, seem to have them strongly connected with their safety and existence; they never part with them; there is an apparatus of poison prepared in the body to accompany their exertions; and when the fangs or stings are taken away, the animal languishes and dies. But it is otherwise with the spine of the fire-flare; it is fixed to the tail, as a quil is into the tail of a fowl, and is annually shed in the same manner: it may be necessary for the creature's defence, but is no way necessary for its existence. The wound inflicted by an animal's tail, has something terrible in the idea, and may from thence alone be supposed to be fatal. From hence terror might have added poison to the pain, and called up imagined dangers: the Negroes universally believe that the sting is poisonous; but they never die of the wound; for, by opening the fish, and laying it to the part injured, it effects a speedy cure. The slightness of the remedy proves the innocence of the wound.*



(The Torpedo.)

The Torpedo is an animal of this kind, equally formidable and well known with the former; but the manner of its operating, is to this hour a mystery to mankind. The body of this fish is almost circular, and thicker than others of the ray kind; the skin is soft, smooth, and of a yellowish colour, marked, as all the kind, with large annular spots; the eyes very small; the tail tapering to a point; and the weight of the fish from a quarter to fifteen pounds. Redi found one twenty-four pounds weight. To all outward appearance, it is furnished with no extraordinary powers; it has no muscles formed for particularly great exertions; no internal conformation perceptibly differing from the rest of its kind: yet such is that unaccountable power it possesses, that, the instant it is touched, it numbs not only the hand and arm, but sometimes also the whole body. The shock received, by all accounts, most resembles the stroke of an electrical machine; sudden, tingling, and painful.

Kempfer has very well described the effects of this animal's shock. Reaumur, who made several trials upon this animal, has at least convinced the world that it is not necessarily, but by an effort, that the torpedo numbs the hand of him that touches it. He tried several times, and could easily tell when the fish intended the stroke, and when it was about to continue harmless. Always before the fish intended the stroke, it flattened the back, raised the head and the tail; and then, by a violent contraction in the opposite direction, struck with its back against the pressing finger; and the body, which before was flat, became humped and round.*

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* The account of the venomous properties of this spine, as well as that it is shed annually, appears to be altogether fabulous. It is probable that, by its great strength, it may be able to inflict a painfully lacerated wound.

But we must not infer, as he has done, that the whole effect of this animal's exertions arise from the greatness of the blow which the fingers receive at the instant they are struck. We will, with him, allow that the stroke is very powerful, equal to that of a musket-ball, since he will have it so; but it is very well known, that a blow, though never so great on the points of the fingers, diffuses no numbness over the whole body: such a blow might break the ends of the fingers indeed, but would hardly numb the shoulder. Those blows that numb, must be applied immediately to some great and leading nerves, or to a large surface of the body; a powerful stroke applied to the points of the fingers will be excessively painful indeed, but the numbness will not reach beyond the fingers themselves. We must, therefore, look for another cause producing the powerful effects wrought by the torpedo.

The most probable solution seems to be that the shock proceeds from an animal electricity, which this fish has some hidden power of storing up, and producing on its most urgent occasions. The shocks are entirely similar; the duration of the pain is the same: but how the animal contrives to renew the charge, how it is prevented from evaporating it on contiguous objects, how it is originally procured, these are difficulties that time alone can elucidate.†

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* THE TORPEDO.—Oppian goes so far as to say, that it will benumb the astonished fisherman, even through the whole length of the line and rod.

The hook'd Torpedo, ne'er forgets its art,
But soon as struck begins to play its part,
And to the line applies it magic sides:
Without delay the subtile power glides
Along the pliant rod, and slender hairs,
Then to the fisher's hand as swift repairs:
Amaz'd he stands; his arms of sense bereft,
Down drops the idle rod; his prey is left:
Not less benumb'd than it had felt the whole
Of frost's severest rage beneath the arctic pole.

But great as its powers are when the fish is in vigour, they are impaired as it declines in strength, and totally cease when it expires. They impart no noxious qualities to it as a food, being commonly eaten by the French, who find it more frequently on their coast than we do on ours. Galen even affirms, that the meat of the Torpedo is of service to epileptic patients; and that the shock of the living fish, applied to the head, is efficacious in removing any pains in that part.

† GYMNOTUS, OR ELECTRICAL EEL.—Baron Humboldt says:—The galvanic electricity of the gymnotus causes a sensation which can hardly be said to be specifically distinct from that which is occasioned by the conductor of an electrical machine, a Leyden jar, or even the voltaic pile. The same observation has been made respecting the torpedo, or electric ray. In the gymnotus, however, the difference that does exist is the more striking in proportion as the shocks are greater. No man exposes himself rashly to the first discharges of a strong and highly irritated gymnotus. If, by accident, a shock be received before the fish is wounded or tired out by the pursuit. this shock is so painful, that it is impossible even to find an expression to describe the nature of the sensation. I do not remember to have ever experienced, from the discharge of a large-sized Leyden jar, a shock so dreadful as one which I received on placing my feet on a gymnotus which had just been drawn out of the water. I felt during the rest of the day an acute pain in the knees, and in almost every joint of the body. A blow upon the stomach, a stone falling on the head, a violent electric explosion, produce instantly the same effect. We distinguish nothing when the whole nervous system is affected at once. To experience the difference believed to exist between the sensations produced by the voltaic pile and electrical fishes, the latter must be touched when they are reduced to a state of extreme weakness. In that case, we observe that the electrical eels and torpedos cause twitchings of the muscles (*subsultus tendinum*), which are propagated along the arm, from the part resting on the electric organ up to the elbow. This trembling, which is not visible externally, slightly resembles the very slight commotions produced by our artificial electrical apparatuses. M. Bayon, some time ago, was struck with this difference; and the common people, to characterize the nature of this extraordinary sensation, still confound, so to say, the cause with the effect. and call the gymnotus *Tremblador* in the Spanish colonies, and *Anguille tremblante* in French Guiana. In fact, on touching these electrical fishes, we seem to feel at every shock a vibration, an internal trembling, which lasts for two or three seconds, and which is followed by a painful numbness.

CHAP. IV.

THE LAMPREY AND ITS AFFINITIES.

There is a species of the Lamprey served up as a great delicacy among the modern Romans, very different from ours.* Whether theirs be the murena of

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If the sensation which is experienced on the contact of the electric eel be different from that which is produced by the voltaic pile or Leyden jar, it is, however, very analogous to the pain caused by applying zinc and silver to wounds on the back and on the hand. These wounds, which I have myself made—one by means of the blistering-fly, and the other by a slight incision—have furnished abundant and convincing proof of the relations which exist between the effect of electrical fishes, and that of the galvanic current established by the application of different metals upon the human body.

After having handled gymnoti for four hours consecutively, we felt, even till the next morning, a pain in the joints of the extremities, a debility in the muscles, and a general uneasiness, which was, without doubt, the consequence of a long and violent irritation of the whole nervous system. M. Van der Lott, surgeon at Essequibo, has published in Holland a Memoir on the Medical Properties of the Electrical Eel. Mr. Bancroft assures us, that at Demerara they are employed for the cure of paralytic subjects; but in the Spanish colonies they know nothing of this property in the gymnotus. The ancients, however, made use of the galvanic electricity of the torpedo, according to Scribonius Largus, in cases of headach, megrims, and gout. And such is all we know respecting medical electricity among the Greeks and the savages of America.

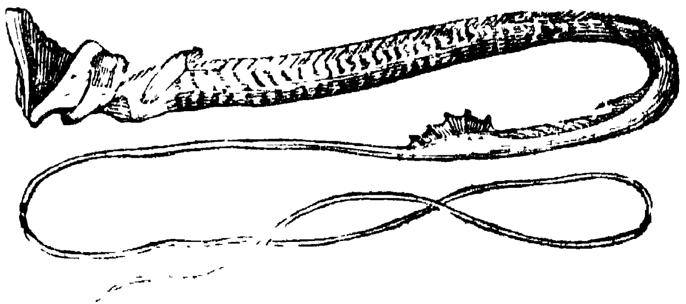
Persons most accustomed to electric shocks support, with repugnance, those given by a torpedo one foot four inches in length; but the power of a gymnotus is ten times greater, as we have seen by its effect upon horses. It often happens, in taking young crocodiles of two or three feet in length, and little fishes in the same net with gymnoti, that the fishes are found dead, and the cocodile expiring. The Indians, in such cases, say that the young crocodile had not time to tear the net, because the gymnotus had paralyzed and put him *hors du combat*. These terrible fishes, although carnivorous and of an aspect hideous as the serpent, are nevertheless in some measure docile, and naturally of a peaceable disposition. Much less active than our eels, they readily accustom themselves to their new prison; they eat everything that is offered them, but without manifesting a great voracity. They do not discharge their violent shocks unless irritated; and then especially if tickled along the under part of the body, at the transparent part of the electric organs, at the pectoral fin, the lips, the eyes, and especially if the skin be touched near the gill-cover. All these parts seem to be the most sensible, for here the skin is thinest and least loaded with fat.

Fishes and reptiles which have never before felt the shocks of a gymnotus, do not seem to be warned of their danger by any particular instinct. Although its form and size are rather imposing, a little tortoise which we put into the same tub approached it with confidence; it wanted to hide itself under the eel's belly; but scarcely had it touched it with the end of one of its feet, when it received a shock, too feeble, indeed, to kill it, but strong enough to make it retire as far away as possible. From that moment the tortoise would no longer remain in the vicinity of the torpedo. And so, in all the pools or streamlets which it inhabits, one finds very few fishes of any other species. The gymnotus often kills without devouring its victim. It instinctively regards as an enemy everything that approaches it. Like a cloud surcharged with the electric fluid, he comes upon the fish he means to destroy; when at a short distance from it, he rests for a few seconds, necessary, perhaps, to prepare the storm that is to burst, and then hurls his thunder against his devoted enemy.—Humboldt and Bonpland.

* In Ancient Times.—We believe that the ancients were unacquainted with this fish; so far is certain, that which Dr. Arbuthnot, and other learned men render by the word *lamprey*, is a species unknown in our seas, being the *Muræna* of Ovid, Pliny, and others, for which we want an English name. This fish, the *Lupus* (our basse), and the *Myxo* (a species of mullet), formed that pride of Roman banquets, the *Tripalinum*, so called, according to Arbuthnot, from their being served up in a machine with three bottoms. The words *Lampetra* and *Petromyzon* are but of modern date, invented from the nature of the fish; the first, *a lambendo petras*, the other from a Greek word, signifying, on the supposition, that they lick or suck the rocks.

the ancients, I will not pretend to say; but there is nothing more certain than that our lamprey is not. The Roman lamprey agrees with the ancient fish in being kept in ponds, and considered by the luxurious as a very great delicacy.

The lamprey known among us is differently estimated, according to the season in which it is caught, or the place where it has been fed. Those that leave the sea to deposit their spawn in fresh waters are the best; those that are entirely bred in our rivers, and that have never been at sea, are considered as much inferior to the former. Those that are taken in the months of March, April, or May, just upon their leaving the sea, are reckoned very good: those that are caught after they have cast their spawn are found to be flabby and of little value. Those caught in several of the rivers in Ireland the people will not venture to touch; those of the English Severn are considered as the most delicate of all other fish whatever.


(The Cordated Eel)*

The lamprey much resembles an eel in its general appearance, but is of a lighter colour, and rather a clumsier make. It differs, however, in the mouth, which is round, and placed rather obliquely below the end of the nose. It more resembles the mouth of a leech than an eel; and the animal has a hole on the top of the head through which it spouts water, as in the cetaceous kind. There are seven holes on each side for respiration; and the fins are formed rather by a lenthening out of the skin than any set of bones or spines for that purpose. As the mouth is formed resembling that of a leech, so it has a property resembling that animal of sticking close to and sucking any body it is applied to. It is extraordinary the power they have of adhering to stones; which they do so firmly as not to be drawn off without some difficulty. We are told of one that weighed but three pounds, and yet it stuck so firmly to a stone of twelve pounds, that it remained suspended at its mouth, from which it was separated with no small difficulty. This amazing power of suction is supposed to arise from the animal's exhausting the air within its body by the hole over the nose, while the mouth is closely fixed to the object, and permits no air to enter. It would be easy to determine the weight this animal is thus able to sustain; which will be equal to the weight of a column of air of equal diameter with the fish's mouth.

The adhesive quality in the lamprey may be in some measure increased by that slimy substance with which its body is all over smeared; a substance that serves at once to keep it warm in its cold element, and also to keep its skin soft and pliant.

Its usual time of leaving the sea, which it is annually seen to do in order to spawn, is about the beginning of spring; and after a stay of a few months it returns again to the sea. Their preparation for spawning is peculiar; their manner is to make holes in the gravelly bottom of rivers; and on this occasion their sucking power is particularly serviceable; for if they meet with a stone of considerable size, they will remove it and throw it out. Their young are produced from eggs in the manner of flat fish; the female remains near the place where they are excluded, and continues with them till they come forth. She is sometimes seen with her whole family playing about her; and after some time she conducts them in triumph back to the ocean.†

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* CORDATED EEL.—This fish inhabits the West Indian seas; its whole length is about thirty-two inches, of which the process at the end of the tail measures twenty-two; the body rich silvery; flexible part belonging to the snout, brown; fins and caudal process, paler brown: the snout is connected to the back part of the head by a flexible, leathery duplicature, which permits it to be extended so that the mouth points upwards, or to fall back so as to be received into a sort of case, formed by the upper part of the head; eyes close to each other, and with short columns of a clear chestnut brown, with a coppery gloss: below the head on each side is a considerably compressed semicircular space, the fore-part of which is bounded by the gill-cover, which seems to consist of a moderately strong membrane; the body gradually diminishes as it approaches the tail, which terminates in a process or string of enormous length, ending in a very fine point; the pectoral fins small, and situate behind the cavity on each side the thorax; the caudal fin has five spinous rays.—MACLOC'S NATURAL HISTORY.

(The Netted Eel.)*

The best season for lampreys is the months of March, April, and May; and they are usually taken in nets with salmon, and sometimes in baskets at the bottom of the river. It has been an old custom for the city of Gloucester, annually to present the king with a lamprey pie: and as the gift is made at Christmas, it is not without great difficulty the corporation can procure the proper quantity, though they give a guinea a piece for taking them.

How much they were valued among the ancients, or a fish bearing some resemblance to them, appears from all the classics that have praised good living, or ridiculed gluttony. One story we are told of this fish, with which I will conclude its history. A senator of Rome, whose name does not deserve being transmitted to posterity, was famous for the delicacy of his lampreys. Tigelinus, Manucius, and all the celebrated epicures of Rome, were loud in his praises: no man's fish had such a flavour, was so nicely fed, or so exactly pickled. Augustus, hearing so much of this man's entertainments, desired to be his guest, and soon found that fame had been just to his merits; the man had indeed very fine lampreys, and of an exquisite flavour. The emperor was desirous of knowing the method by which he fed his fish to so fine a relish; and the glutton, making no secret of his art, informed him that his way was to throw into his ponds such of his slaves as had at any time displeased him. Augustus, we are told, was not much pleased with his receipt, and instantly ordered all his ponds to be filled up. The story would have ended better if he had ordered the owner to be flung in also.‡

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* **Netted Eel.**—The head and mouth of this beautiful species is small, without barbles: the eyes are near the upper lip, of a blue and white colour: the teeth stand apart from each other, and those in front are the longest: the body is variegated with black and white spots, like network, and the dorsal fin extends the whole length of the back.

This species is from two to three feet in length, and was found near the coast of Tranquebar: but little is known of its natural history.

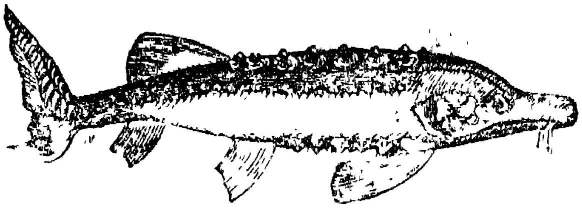
† **Species.**—There are about nine species of lampreys known. The *Lesser Lamprey* inhabits Europe, Japan, and the lakes of South America; it measures from twelve to fifteen inches long: it ascends fresh water rivers in the spring, and after a few months returns again to the sea.

The *Lampern* is also an inhabitant of the European rivers, particularly the Isis, near Oxford; is from six to seven inches long. It conceals itself under stones, or in the mud, and does not adhere to stones, like the others. The body is round, and tapering at each end, and annulate; it is of a greenish colour above, yellowish at the sides, and white beneath; the mouth is lobate, and without teeth; the fins are hardly a line broad; the second dorsal fin is linear; the tail lanceolate, and sharp at the end.

‡ **Lampreys.**—They are reckoned a great delicacy, either when potted or stewed, but are a surfeiting food, as one of our monarchs fatally experienced—Henry I.'s death being occasioned by a too plentiful meal of this fish. It appears that, notwithstanding this accident, they continued in high esteem; for Henry IV granted protections to such ships as brought over lampreys for the table of his royal consort. His successor issued out a warrant to William of Nantes for supplying him and his army with lampreys, wheresoever they happened to march.

CHAP. V.

THE STURGEON AND ITS VARIETIES.



(The Sturgeon.)

The Sturgeon, with a form as terrible and a body as large as the shark, is yet as harmless as the fish we have been just describing; incapable and unwilling to injure others, it flies from the smallest fishes, and generally falls a victim to its own timidity.

The sturgeon in its general form resembles a fresh-water pike. The nose is long, the mouth is situated beneath, being small, and without jaw-bones or teeth. But, though it is so harmless and ill provided for war, the body is formidable enough to appearance. It is long, pentagonal, and covered with five rows of large, bony knobs, one row on the back, and two on each side, and a number of fins to give it greater expedition. Of this fish there are three kinds; the Common Sturgeon, the Caviare Sturgeon, and the Huso or Isinglass fish.* The first has eleven knobs or scales on the back; the second has fifteen; and the latter thirteen on the back and forty-three on the tail. These differences seem slight to us who only consider the animal's form; but those who consider its uses find the distinction of considerable importance. The first is the sturgeon, the flesh of which is sent pickled into all parts of Europe. The second is the fish from the roe of which that noted delicacy called caviare is made; and the third, besides supplying the caviare, furnishes also the valuable commodity of isinglass. They all grow to a very great size; and some of them have been found above eighteen feet long.

There is not a country in Europe but what this fish visits at different seasons; it annually ascends the largest rivers to spawn, and propagates in an amazing number. The inhabitants along the banks of the Po, the Danube, and the Wolga, make great profit yearly of its incursions up the stream, and have their nets prepared for its reception.† The sturgeon also is brought daily to the markets of Rome and Venice, and they are known to abound in the Mediterranean sea. Yet those fish that keep entirely either in salt or fresh water are but comparatively small. When the sturgeon enjoys the vicissitude of fresh and salt water, it is then that it grows to an enormous size, so as almost to rival even the whale in magnitude.

Nor are we without frequent visits from this much esteemed fish in England. It is often accidentally taken in our rivers in salmon-nets particularly in those parts that are not far remote from the sea. The largest we have heard of caught in Great Britain, was a fish taken in the Esk, where they are most frequently found, which weighed four hundred and sixty pounds. An enormous size to those who have only seen our fresh-water fishes!‡

As the sturgeon is a harmless fish, and no way voracious, it is never caught by a bait in the ordinary manner of fishing, but always in nets. From the description given above of its mouth, it is not to be supposed that the sturgeon would swallow any hook capable of holding so large a bulk and so strong a swimmer. In fact, it never attempts to seize any of the finny tribe, but lives by rooting at the bottom of the sea, where it makes insects and sea-plants its whole subsistence. From this quality of floundering at the bottom it has received its name; which comes from the German verb *stoeren*, signifying to wallow in the mud. That it lives upon no large animals is obvious to all those who cut it open, where nothing is found in its stomach but a kind of slimy substance, which has induced some to think it lives only upon water and air. From hence there is a German proverb, which is applied to a man extremely temperate, when they say he is as moderate as a sturgeon.

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* Five species of sturgeon are now known. The two additional inhabit the Caspian Sea.

† In America, Sturgeons are found in vast abundance in the American Rivers in May, June, and July, particularly in those of Virginia, where they are in such multitudes, that six hundred have been taken in two days, with no more trouble than putting down a pole with a hook at the end, to the bottom, and drawing it up again, on perceiving that it rubbed against a fish.

‡ In England, these fish are by no means abundant on our coast; when any are caught, they are generally forwarded to the Royal table.

As the sturgeon is so temperate in its appetites, so is it also equally timid in its nature. There would be scarce any method of taking it, did not its natural desire of propagation induce it to incur so great a variety of dangers. The smallest fish is alone sufficient to terrify a shoal of sturgeons; for, being unfurnished with any weapon of defence, they are obliged to trust to their swiftness and their caution for security. Like all animals that do not make war upon others, sturgeons live in society among themselves; rather for the purposes of pleasure, than from any power of mutual protection. Gesner even asserts, that they are delighted with sounds of various kinds; and that he has seen them shoal together, at the notes of a trumpet.

The usual time, as was said before, for the sturgeon to come up rivers to deposit its spawn, is about the beginning of summer, when the fishermen of all great rivers make a regular preparation for its reception. At Pillau particularly, the shores are formed into districts, and allotted to companies of fishermen, some of which are rented for about three hundred pounds a year. The nets in which the sturgeon is caught, are made of small cord, and placed across the mouth of the river; but in such a manner that, whether the tide ebbs or flows, the pouch of the net goes with the stream. The sturgeon thus caught, while in the water, is one of the strongest fishes that swims, and often breaks the net to pieces that incloses it; but the instant it is raised with its head above water, all its activity ceases: it is then a lifeless, spiritless lump, and suffers itself to be tamely dragged on shore. It has been found prudent, however, to draw it to shore gently; for, if excited by any unnecessary violence, it has been found to break the fishermen's legs with a blow of its tail. The most experienced fishers, therefore, when they have drawn it to the brink, keep the head still elevated, which prevents its doing any mischief with the hinder part of the body; others, by a nooze, fasten the head and the tail together; and thus without immediately dispatching it, bring it to the market, if there be one near; or keep it till their number is completed for exportation.

The flesh of this animal pickled is very well known at all the tables of Europe; and is even more prized in England than in any of the countries where it is usually caught.

A very great trade is carried on with the roe of the sturgeon, preserved in a particular manner, and called Caviare: it is made from the roe of all kinds of sturgeon, but particularly the second. This is much more in request in other countries of Europe than with us.*

The Huso or Isinglass Fish furnishes a valuable commodity. This fish is caught in great quantities in the Danube, from the months of October to January: it is seldom under fifty pounds weight, and often above four hundred: its flesh is soft, glutinous and flabby; but it is sometimes salted, which makes it better tasted, and then it turns red like salmon. It is for the commodity it furnishes that it is chiefly taken. Isinglass is of a whitish substance, inclining to yellow; done up into rolls, and so exported for use. It is very well known as serviceable not only in medicine, but many arts. This article is principally furnished from Russia, where they prepare great quantities surprisingly cheap.[*]

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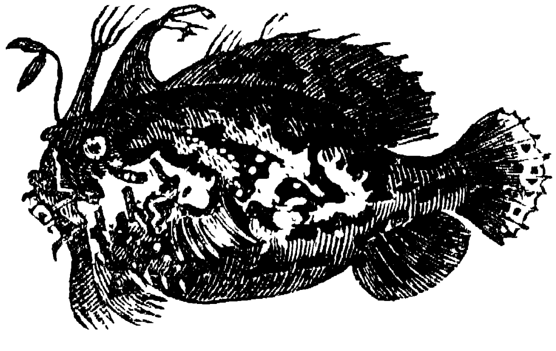
* CAVIARE.—This article is made of the roes of this, and also of all the other sorts of sturgeons, dried, salted and packed up close. The best is said to be made of those of the Sterlet, a small species frequent in the Yaik and Volga.

CHAP. VI.

ANOMALOUS CARTILAGINOUS FISHES.

Of all others, the cartilaginous class seems to abound with the greatest variety of ill formed animals, and, if philosophy could allow the expression, we might say, that the cartilaginous class was the class of monsters: in fact, it exhibits a variety of shapeless beings, the deviations of which from the usual form of fishes are beyond the power of words to describe, and scarcely of the pencil to draw. In this class we have the Pipe Fish, that almost tapers to a thread, and the Sun Fish, that has the appearance of a bulky head, but the body cut off in the middle; the Hippocampus, with a head somewhat like that of a horse, and the Water Bat, whose head can scarcely be distinguished from the body. In this class we find the Fishing Frog, which from its deformity some have called the Sea Devil, the Chimæra, the Lump Fish, the Sea Porcupine, and the Sea-Snail. Of all these the history is but little known; and naturalists supply the place with description[‡]



(Spotted Toad Fish.)[†]

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[*] Isinglass. — This article is prepared from various other fishes, but principally from the White Dolphin, or Belliga of North America. This well-known substance is made from the sound or air bladder.

[†] The Spotted Toad Fish.—The head is small; the lower jaw protrudes beyond the upper, both furnished with very small teeth, like a file; in the middle there is a small cartilage, which serves instead of a tongue; the lips, and indeed many other parts of the body, send out barbles The body is laterally compressed, and armed with crooked spines: the head and back are broad in front, but go tapering towards the tail; the belly is thick, and swelling out. From the upper lip shoots out an elastic barble, at the end of which are two long fleshy substances, which seem as if formed for holding prey; behind this barble is another fleshy ray, and stronger; and between that and the dorsal fin another still thicker; both are fastened to the back by a skin; these instruments help this clumsy, slow swimming animal in catching its prey. The eyes are near the mouth; they are round; they have a black pupil, and the iris is yellow, striped with brown.

This fish is yellow on the sides and back; brown on the belly; and the body and fins are varied with stripes and spots of brown colour, of different shapes; the stripes are broad in some parts, in others only strokes; some have white spots, others brown edged with white. The pectoral and ventral fins give this animal the look of a quadruped, but the other fins show it to be a fish. It has no lateral line, any more than the rest of the genus The skin on the belly is thin, and only fastened to the flesh here and there by little bandages.

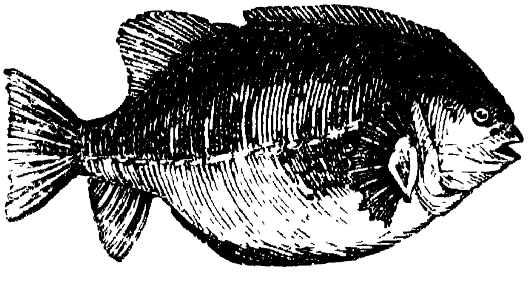
This fish is found in Brazil and China; it generally keeps at the bottom of the water among sea-weed or between stones, and grows to the length of nine or ten inches.—Macloc's Natural History.

[‡] The Telescope Fish.—The whole body of this fish, and the ground colour of the fins, are of a beautiful red, darker towards the back, and lighter towards the belly; the membranes of the fins are almost white and the

The Sun Fish sometimes grows to a very large size; one taken near Plymouth was five hundred weight. In form it resembles a bream, or some deep fish cut off in the middle: the mouth is very small, and contains in each jaw two broad teeth, with sharp edges; the colour of the back is dusky and dappled, and the belly is of a silvery white. When boiled, it has been observed to turn to a glutinous jelly, and would most probably serve for all the purposes of isinglass, were it found in sufficient plenty.

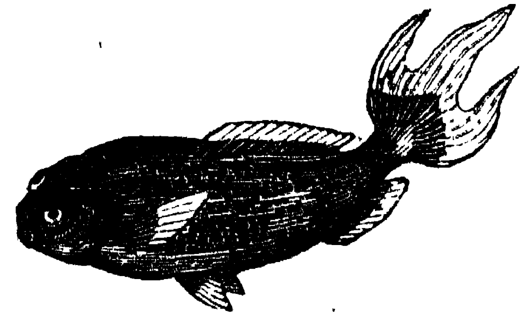
The Fishing Frog in shape very much resembles a tadpole or young frog, but then a tadpole of enormous size, for it grows to above five feet long, and its mouth is sometimes a yard wide. Nothing can exceed its deformity. The head is much bigger than the whole body; the under jaw projects beyond the upper, and both are armed with rows of slender, sharp teeth: the palate and the tongue are furnished with teeth in like manner; the eyes are placed on the top of the head, and are encompassed with prickles; immediately above the nose are two long beards or filaments, small in the beginning, but thicker in the end, and round: these, as it is said, answer a very singular purpose; for, being made somewhat resembling a fishing-line, it is asserted that the animal converts them to the purposes of fishing. With these extended, as Pliny asserts, the fishing frog hides in muddy waters, and leaves nothing but the beards to be seen. The curiosity of the smaller fish brings them to view these filaments, and their hunger induces them to seize the bait; upon which the animal in ambush instantly draws in its filaments, with the little fish that had taken the bait, and devours it without mercy.

The Lump Fish is trifling in size, compared to the former. If flung into a pail of water, it will stick so close to the bottom that, on taking the fish by the tail, one may lift up pail and all, though it hold several gallons of water. Great numbers of these fish are found along the coasts of Greenland in the beginning of summer, where they resort to spawn. Their roe is remarkably large, and the Greenlanders boil it to a pulp for eating. They are extremely fat, but not admired in England, being both flabby and insipid.


(The Lump Fish.)

The Sea Snail takes its name from the soft and unctuous texture of its body, resembling the snail upon land It is almost transparent, and soon dissolves and melts away. It is but a little animal, being not above five inches long. It is taken in England at the mouths of rivers, four or five miles distant from the sea

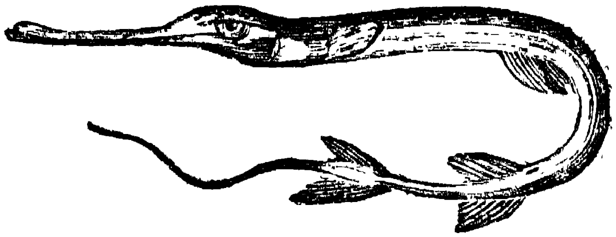
The body of the Pipe Fish, in the thickest part, is not thicker than a swanquill, while it is above sixten inches long. This is angular, but the angles being not very sharp, they are not discernible until the fish is dried. Its general colour is an olive brown, marked with numbers of bluish lines, pointing from the back to the belly. It is viviparous; for, on crushing one that was just


(Telescope Fish.)

red rays shining through them have a very fine effect: the three white points of the tail form, to the idea, a trident or a tulip: the head is short, but large; the mouth is small; and the nostrils single: the pupil of the eye is black; the iris yellow; the back is round; the lateral line nearer the back than the head: the scales are large, and the rays of the fins ramified. This beautiful fish is found in the fresh waters of China, and is supposed to be a variety of the gold fish.

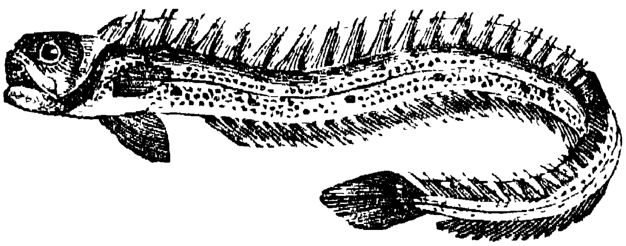
Macloc's Natural History.

taken, hundreds of very minute young ones were observed to crawl about.*


(The Pipe Fish.)

The Hippocampus, which, from the form of its head, some call the Sea Horse, never exceeds nine inches in length. It is about as thick as a man's thumb, and the body is said, while alive, to have hair on the fore part, which falls off when it is dead. The snout is a sort of a tube with a hole at the bottom, to which there is a cover, which the animal can open and shut at pleasure. Behind the eyes there are two fins, which look like ears; and above them are two holes which serve for respiration. The whole body seems to be composed of cartilaginous rings, on the intermediate membranes of which several small prickles are placed. It is found in the Mediterranean, and also in the Western Ocean; and, upon the whole, more resembles a great caterpillar than a fish. The ancients considered it as extremely venomous, probably induced by its peculiar figure.

From these harmless animals, covered with a slight coat of mail, we may proceed to others, more thickly defended, and more formidably armed, whose exact station in the scale of fishes is not yet ascertained.


(The Riband Fish.)†

In the first of this tribe we may place the Sea Orb, which is almost round, has a mouth like a frog, and is from seven inches to two

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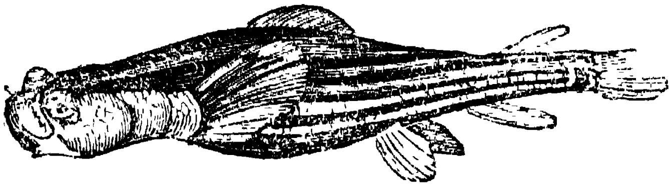
* The Tobacco-Pipe Fish.—The species is known in the seas of both Indies and at Brazil. The head is very long, quadrangular, and adorned with rays; the aperture of the mouth is wide, and in an oblique direction; the lower jaw is somewhat longer than the upper; the teeth are small; the tongue movable; the nostrils double, and near the eyes, which are large, with a black pupil and silvery iris: the body is devoid of visible scales, flat in the front part, and rounded towards the tail: the lateral line has a straight direction: the anus is much nearer the tail-fin than the head; the belly long; the fins short; the rays mostly four-branched. This fish is brown, spotted with blue on the back; the sides and belly silvery; the fins are red.

It grows three or four feet long, living on small fry and lobsters; it is very plentiful, but lean, therefore only eaten by the poor.—Macloc's Natural History.

† The Riband Fish.—The head of this fish is broadest at top, the mouth large, and opening obliquely; the under jaw is the longest, and both are armed with sharp teeth, one row in the upper, and two in the lower: the tongue is thin, broad, and rough: the eyes are large, standing at the top of the head; the pupil is black; the iris silver, mixed with blue; there is a round hole in the inner edge of each eye; the aperture of the gills is wide; the covert single; before each aperture are five minute holes, and several of the same kind near the eye; they probably secrete a viscous or slimy matter. This fish has an extremely slender and tapering shape; the body being twelve inches in length, and scarcely one in thickness; it is of a silvery colour, and semi-transparent. The pectoral fins are small; and their rays so slender that they are almost imperceptible. About an inch behind the head rises the dorsal fin, which is continued till it joins the tail, where it meets the anal fin, which begins so near the throat, that the anus is situated immediately below the angle of the lower jaw. The fins display a great brilliancy of colour, being of a most beautiful red, with five spots of a deeper or brighter cast placed on each side of the body: the tail is wedge-shaped: the head is of a silver colour, mingled with red; the back is grey; and the sides and belly silvery.

This fish is found in the Mediterranean; it is sold in the markets of Rome, but its flesh is of an indifferent quality, and very lean. It is mostly used for bait. It lives on feet long. Like the porcupine, from whence it sometimes takes its name, being also called the Sea Porcupine, it is covered over with long thorns, or prickles, which point on every side; and, when the animal is enraged, it can blow up its body as round as a bladder. Of this extraordinary creature there are many kinds: some threatening only with spines, as the Sea Hedgehog; others defended with a bony helmet that covers the head, as the Ostracion; others with a coat of mail from the head to the tail, where it terminates in a point, as the Centriscus; and others still armed offensively and defensively with bones and spines, as the Shield Orb.


(The Four-eyed Loach.)*

Of these, scarce one is without its peculiar weapon of offence. The centriscus wounds with its spine; the ostracion poisons with its venom; the orb is impregnable, and is absolutely poisonous, if eaten. Indeed, their figure is not such as would tempt one to make the experiment; and the natives of those countries where they are found are careful to inform foreigners of their danger: yet a certain sailor at the Cape of Good Hope, not believing what the Dutch told him concerning their venom, was resolved to make the experiment, and break through a prejudice which he supposed was founded on the animal's deformity. He tried and ate one; but his rashness cost him his life; he instantly fell sick, and died a few days after.

These frightful animals are of different sizes; some not bigger than a football, and others as large as a bushel. They almost all flatten and erect their spines at pleasure, and increase the terrors of their appearance in proportion to the approach of danger. At first they seem more inoffensive; their body oblong, with all their weapons pointing towards the tail; but upon being provoked or alarmed, the body that before seemed small, swells to the view, the animal visibly grows rounder and larger, and all its prickles stand upright, and threaten the invader on every side. The Americans often amuse themselves with the barren pleasure of catching these frightful creatures by a line and hook baited with a

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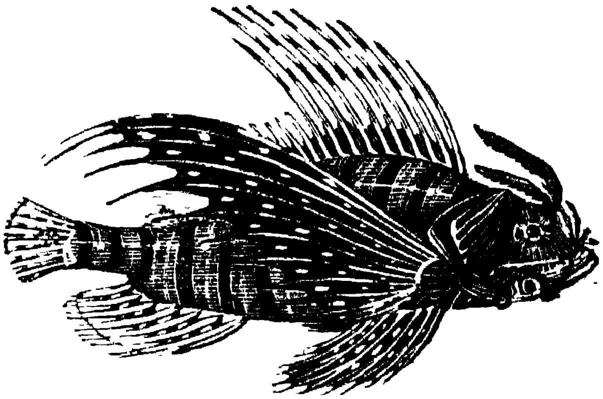
young crabs and other small shell-fish. It haunts marshy places near the shores, and may be caught with a line baited with a worm or the shell of a small crab.—Macloc's Natural History.

[*] The Four-eyed Loach.—The head of this species is broader than high, and the forehead shortened; the lower jaw is the longest, and it lengthens downwards, not in front, like other fish. Both jaws, as well as the palate and tongue, are armed with teeth; the barbles arise from the corners or extremities of the upper lip: the nostrils are single, and near the mouth: the eyes are very remarkable; each containing two parts, or a double pupil, which has caused them to be called four eyes: the cavity of the eyes differs from other fish; this cavity is not a cylinder, as in other animals, but a part of one only: on each side, at the top of the head, there is an arched, thin bone advancing towards the skull: these bones face each other with their concave surfaces; the eye is cylindrical, and is fixed in this cavity, but rises above it: the pupil is seen above the surface, inclosed in a black iris: as the corner is equally luminous in the internal part, the pupil is seen double. The gill coverts are smooth and slippery; the body upwards is broader than it is thick; but it takes a rounded form towards the tail; the sides are ornamented with five longitudinal dark-brown stripes; they run quite to the tail, where the two outermost are connected by a transverse stripe, and the three middlemost by another: the lateral line is scarcely visible; the anus is nearer to the tail than to the head; the dorsal fin is small, and near the tail. All the fins, except the ventrals, are covered mostly with small scales; on the body, the scales are larger. It is viviparous, like the whale, and produces its young alive.

This singular fish is found in the rivers of Surinam. It multiplies fast, and is esteemed by the inhabitants as good food: it grows from six to ten inches in length.

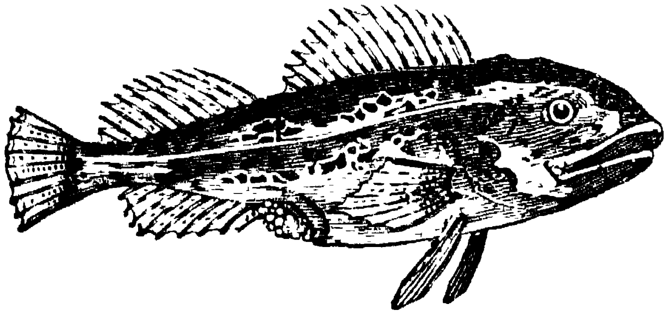
Of the loach kind of fish there are eleven different species: we have inserted the above as being the most curious.—Macloc's Natural History.

piece of sea-crab. The animal approaches the bait with its spines flattened; — but when hooked and stopped by the line, straight all its spines are erected; the whole body being armed in such a manner at all points, that it is impossible to lay hold of it on any part. For this reason it is dragged to some distance from the water, and there it quickly expires. In the middle of the belly of all these there is a sort of bag or bladder filled with air, and by the inflation of which the animal swells itself in the manner already mentioned.



(The Flying Scorpion.)*

In describing the deformed animals of this class, one is sometimes at a loss whether it be a fish or an insect that lies before him. Thus the hippocampus and the pipe-fish bear a strong resemblance to the caterpillar and the worm, while the lesser orb bears some likeness to the class of sea eggs to be described after. I will conclude this account of cartilaginous fishes with the description of an animal, which I would scarcely



(The Sea Scorpion.)†

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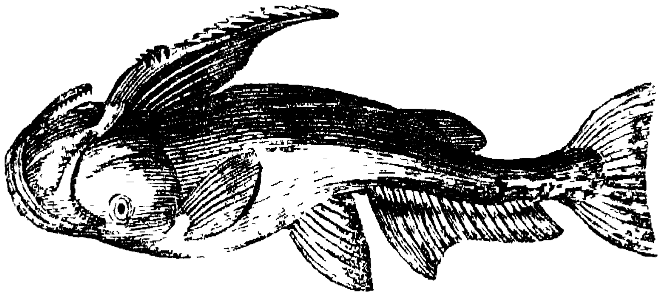
* The Flying Scorpion.—The head of this fish is truncated, broad in front, compressed at the sides, furnished with pretty large spines and fringed barbles; the longest of these are over the eyes, and the broadest near the corners of the mouth. There are several brown stripes on the body and head, with yellow and white streaks alternately shining between: the mouth is large; the jaws of equal length, and armed with a great number of little, sharp teeth: the tongue is loose, thin, and pointed at the end; the lips are movable also; the upper lip is composed of two bones, which form a furrow in the middle where they join: the nostrils are single, and lie midway between the mouth and eyes: the eyes have a black pupil, and a white iris, with blue and black rays: the gill covert terminates in a sharp angle, and is furnished with very minute scales; the aperture is wide, and the branchial membrane is in great part naked. The scales on the body are small, and lie one over the other, like tiles on a house. The lateral line consists of little risings and white points: the rays of the pectoral fins are simple, and the membrane has a violet ground, with white dots; these large fins probably enable the fish to dart out of the water when pursued by an enemy. The first twelve rays of the dorsal fin are spiny, spotted brown and yellow, united below by a dark-brown membrane, and at liberty above; the last twelve rays, as well as those of the anal and tail fins, are divided at the ends, and spotted black and yellow. The ventral fins are violet, with white dots: the first ray is hard.—Macloc's Natural History.

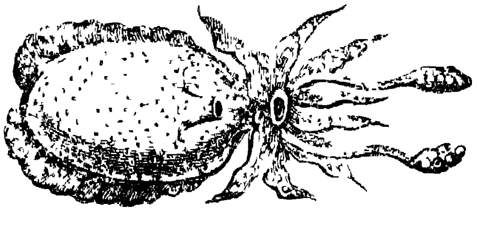
† The Sea Scorpion.—The mouth of this curious fish is wide, but without teeth; the head is flattish in the middle, but over each eye there appears a serrated ridge rising from it: the gills on each side have sharp, horny spurs on their edges, tending backwards, by which it derives its latter name: the body is almost as wide as it is deep, and the under side is of a silverish colour, tinged with red: the upper side is of a dusky brown, sprinkled with small black spots, with some large clouds of black. It has a lateral line from head to tail, and also two fins on the back, one on the belly behind the vent, and tail-fin: two narrow fins, or feelers, are placed under the fore part of the belly, of a whitish colour, each having only three spines.

The fish is found in the Mediterranean sea, and in several parts of the ocean: it keeps near the shores, and lies concealed among sea-weed, to prey on small strayed fishes.—Macloc's Natural History.

call a fish, but that Father Labat dignifies it with the name. Indeed, this class teems with such a number of odd-shaped animals, that one is prompted to rank everything extraordinary of the finny species among the number; but, besides Labat says its bones are cartilaginous, and that may entitle it to a place here


(The Horned Silure.)†

The animal I mean is the Galley Fish,* which Linnæus degrades into the insect tribe, under the title of the Medusa, but which I choose to place in this tribe from its habits, that are somewhat similar. To the eye of an unmindful spectator, this fish seems a transparent bubble swimming on the surface of the sea, or like a bladder variously and beautifully painted with vivid colours, where red and violet predominate, as variously opposed to the beams of the sun. It is, however, an actual fish; the body of which is composed of cartilages, and a very thin skin filled with air, which thus keeps the animal floating on the surface, as the waves and the winds happen to drive. Sometimes it is seen thrown on the shore by one wave, and again washed back into the sea by another. Persons who happen to be walking along the shore often happen to tread upon these animals; and the bursting of their body yields a report like that when one treads upon the swim of a fish. It has eight broad feet with which it swims, or which it expands to catch the air as with a sail. It fastens itself to whatever it meets by means of its legs, which have an adhesive quality. Whether they move when on shore Labat could never perceive, though he did everything to make them stir; he only saw that it strongly adhered to whatever substances he applied to it. It is very common in America, and grows to the size of a goose-egg, or somewhat more. It is perpetually seen floating, and no efforts that are used to hurt it can sink it to the bottom. All that appears above water is a bladder, clear and transparent as glass, and shining with the most beautiful colours of the rainbow. Beneath, in the water, are four of the feet already mentioned that serve as oars, while the other four are expanded above to sail with. But what is most


(The Cuttle-fish.)‡

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* Commonly called the Sea Blubber.

† THE HORNED SILURE.—The head of this fish is broad, flat, and thin; and the horns, which occupy the place of eyes in other species, are armed with short, crooked spines, like teeth, and are probably weapons of defence; the eyes lie on each side of the head near the mouth: the head and body are entirely covered with a skin resembling leather; and the tail fin slightly forked.

This fish is of a very dark green colour; the sides are somewhat lighter. Another remarkable peculiarity in this fish is the dorsal fin: it is close to the head; and its front ray is long, stiff, dented like the horns, and is probably an instrument of defence also: the belly is short and thick; and the lateral line goes meandering along the middle of the body, and puts out branches each way. This species grows to a considerable size; its flesh is eatable, but not much sought after. It is found near the shores of Asia and Surinam.

One of these fishes, caught at Surinam, on examination, was observed to have its mouth filled with yellow eggs, in none of which, however, could be found a fish completely formed; from which it is concluded that the silure, to defend her eggs from the voracious tribes, hatches them instinctively in her mouth. But she is supposed, at times, to emit them from her mouth, when in search of food to appease her appetite, and when satisfied, to take them into her mouth again

Of the silure tribe, there are upwards of thirty different species.

‡ THE CUTTLE-FISH is one of the most curious creatures of "the watery kingdom" It is popularly termed a fish, though it is, in

remarkable in this extraordinary creature, is the violent pungency of the slimy substance with which its legs are smeared. If the smallest quantity but touch the skin, so caustic is its quality that it burns it like hot oil dropped on the part affected. The pain is worst in the heat of the day, but ceases in the cool of the

fact, a worm, belonging to the order termed *Mollusca* (*Molluscus*, soft), from the body being of a pulpy substance and having no skeleton. It differs in many respects from other animals of its class, particularly with regard to its internal structure, the perfect formation of the viscera, eyes, and even organs of hearing. Moreover, it has "three hearts, two of which are placed at the root of the two branchiæ (or gills); they receive the blood from the body, and propel it into the branchiæ. The returning veins open into the middle heart, from which the aorta proceeds."

Of Cuttle-fish there are several species. That represented in the annexed Cut is the common or officinal Cuttle-fish (*Sepia officinalis*, Lin.) It consists of a soft, pulpy body, with processes or arms, which are furnished with small holes or suckers, by means of which the animal fixes itself in the manner of cupping-glasses These holes increase with the age of the animal; and in some species amount to upwards of one thousand. The arms are often torn or nipped off by shell or other fishes, but the animal has the power of speedily reproducing the limbs By means of the suckers the cuttle-fish usually effects its locomotion. "It swims at freedom in the bosom of the sea, moving by sudden and irregular jerks, the body being nearly in a perpendicular position, and the head directed downwards and backwards. Some species have a fleshy, muscular fin on each side, by aid of which they accomplish these apparently inconvenient motions; but, at least, an equal number of them are finless, and yet can swim with perhaps little less agility. Lamarck, indeed, denies this, and says that these can only trail themselves along the bottom by means of the suckers. This is probably their usual mode of proceeding; that it is not their only one, we have the positive affirmation of other observers." Serviceable as these arms undoubtedly are to the cuttle-fish, Blumenbach thinks it questionable whether they can be considered as organs of touch, in the more limited sense to which he has confined that term.

The jaws of the cuttle-fish, it should be observed, are fixed in the body because there is no head to which they can be articulated. They are of horny substance, and resemble the bill of a parrot. They are in the centre of the under part of the body, surrounded by the arms. By means of these parts, the shell-fish which are taken for food, are completely triturated.

We now come to the most peculiar parts of the structure of the cuttle-fish, viz. the *ear and eye*, inasmuch as it is the only animal of its class, in which anything has hitherto been discovered at all like an organ of hearing, or that has been shown to possess true eyes. The ears consist of two oval cavities, in the cartilaginous ring, to which the large arms of the animal are affixed. In each of these is a small bag, containing a bony substance, and receiving the termination of the nerves, like those of the vestibulum (or cavity in the bone of the ear) in fishes. The nature of the eyes cannot be disputed. "They resemble, on the whole, those of red-blooded animals, particularly fishes; they are at least incomparably more like them than the eyes of any known insects; yet they are distinguished by several extraordinary peculiarities. The front of the eye-ball is covered with a loose membrane instead of a cornea; the iris is composed of a firm substance; and a process projects from the upper margin of the pupil, which gives that membrane a semilunar form" The exterior coat or ball is remarkably strong, so as to seem almost calcareous, and is, when taken out, of a brilliant pearl colour; it is worn in some parts of Italy, and in the Grecian islands by way of artificial pearl in necklaces.

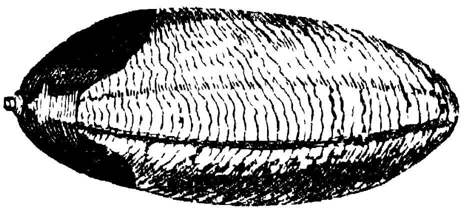
Next we may notice the curious provision by which the cuttle-fish is enabled to elude the pursuit of its enemies in the "vasty deep" This consists of a black, inky fluid (erroneously supposed to be the bile), which is contained in a bag beneath the body. The fluid itself is thick, but miscible with water to such a degree, that a very small quantity will colour a vast bulk of water. Thus, the comparatively small cuttle-fish may darken the element about the acute eye of the whale. What omniscience is displayed in this single provision, as well as in the faculty possessed by the cuttle-fish of reproducing its mutilated arms! All Nature beams with such beneficence, and abounds with such instances of divine love for every creature, however humble: in observing these provisions, how often are we reminded of the benefits conferred by the same omniscience upon our own species. It is thus, by the investigation of natural history, that we are led to the contemplation of the sublimest subjects; thus that man with God himself holds converse.

The "bone" of the cuttle-fish now claims attention. This is a complicated calcareous plate, lodged in a peculiar cavity of the back, which it materially strengthens. This plate has long been known in the shop of the apothecary under the name of cuttle-fish bone: an observant reader may have noticed scores evening. It is from feeding on these that he thinks the poisonous quality contracted by some West Indian fish may be accounted for. It is certain these animals are extremely common along all the coasts in the Gulf of Mexico; and whenever the shore is covered with them in an unusual manner, it is considered as a certain forerunner of a storm.

CHAP. I.

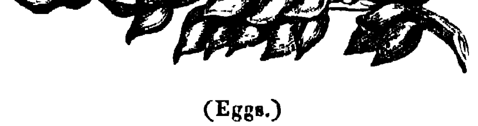
SPINOUS FISHES IN GENERAL.

The third general division of fishes is into that of the Spinous or bony kind. These are obviously distinguished from the rest by having a complete bony covering to their gills; by their being furnished with no other method of breathing but gills only; by their bones, which are sharp and thorny; and their tails, which are placed in a situation perpendicular to the body. This is that class which alone our later naturalists are willing to admit as fishes. The Cetaceous



(" Bone " or Plate)

of these plates in glasses labelled *Os Sepiæ* Reduced to powder, they were formerly used as an absorbent, but they are now chiefly sought after for the purpose of polishing the softer metals. It is, however, improper to call this plate bone, since, in composition, " it is exactly similar to *shell*, and consists of various membranes, hardened by carbonate of lime (the principal material of shell), without the smallest mixture of phosphate of lime, or the chief material of bone".



(Eggs.)

Lastly, are the *ovaria*, or egg-bags of the cuttle-fish, which are popularly called *sea-grapes*. The female fish deposits her eggs in numerous clusters, on the stalks of fuci, on corals, about the projecting sides of rocks, or on any other convenient substances. These eggs, which are of the size of small filberts, are of a black colour.

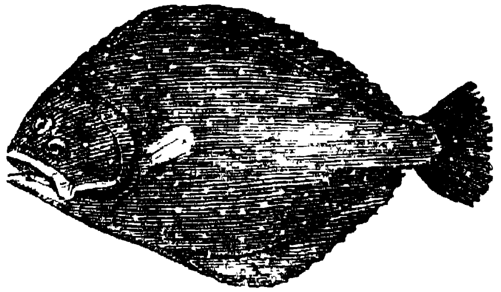
The most remarkable species of cuttle fish inhabits the British seas; and, although seldom taken, its bone or plate is cast ashore on different parts of the coast from the south of England to the Zetland Isles. We have picked up scores of these plates, and bunches of the egg-bags or grapes, after rough weather on the beach between Worthing and Rottingdean; but we never found a single fish.

The cuttle-fish was esteemed a delicacy by the ancients, and the moderns equally prize it. Captain Cook speaks highly of a soup he made from it; and the fish is eaten at the present day by the Italians, and by the Greeks, during Lent. We take the most edible species to be the *octopodia*, or eight-armed, found particularly large in the East Indies and the Gulf of Mexico. The common species here figured, when full-grown, measures about two feet in length, is of a pale, bluish-brown colour, with the skin marked by numerous dark purple specks.

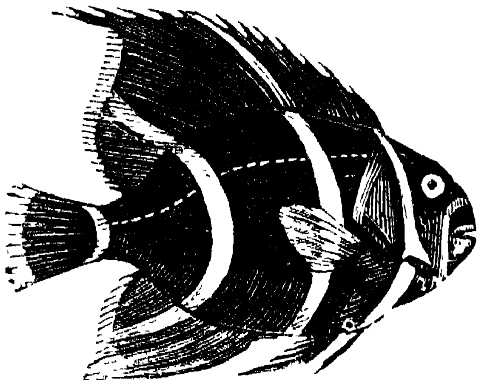
The cuttle-fish is described by some naturalists, as naked or shell-less. It is often found attached to the shell of the paper nautilus, which it is said to use as a sail. It is, however, very doubtful whether the cuttle-fish has a shell of its own. There is a controversy upon the subject. Aristotle, and our contemporary, Home, maintain it to be parasitical: Cuvier and Ferrusac, non-parisitical; but the curious reader will find the *pro* and *con.*—the majority and minority—in the Magazine of Natural History, vol. iii. p. 535.—MIRROR.

class with them are but beasts that have taken up their abode in the ocean; the Cartilaginous class are an amphibious band, that are but half denizens of that element: it is fishes of the Spinous kind that really deserve the appellation.

The history of any one of this class very much resembles that of all the rest: they breathe air and water through the gills; they live by rapine, each devouring such animals as its mouth is capable of admitting; and they propagate, not by bringing forth their young alive, as in the cetaceous tribes, nor by distinct eggs, as in the generality of the cartilaginous tribes, but by spawn, or peas, as they are generally called, which they produce by hundreds of thousands. These are the leading marks that run through their whole history, and which have so much swelled books with tiresome repetition.


(The Turbot Flounder.)

It will be sufficient therefore to draw this numerous class into one point of view, and to mark how they differ from the former classes; and what they possess peculiarly striking, so as to distinguish them from each other. The first object that presents itself, and that by which they differ from all others, are the bones. These, when examined but slightly, appear to be entirely solid; yet, when viewed more closely, every bone will be found hollow, and filled with a substance less rancid and oily than marrow. These bones are very numerous, and pointed; and as in quadrupeds, are the props or stays to which the muscles are fixed, which move the different parts of the body.


(Bow-Banded Chetedon.)*

As the spinous fish partake less of the quadruped in their formation than any others, so they can bear to live out of their own element a shorter time. In general, when taken out of the water, they testify their change by panting more violently and at closer intervals, the thin air not furnishing their gills the proper play; and in a few minutes they expire. Some indeed are more vivacious in air than others; the eel will lay several hours out of water; and the carp has been known to be fattened in a damp cellar. The method is by placing it in a net well wrapped up in wet moss, the mouth only out, and then hung up in a vault. The fish is fed with white bread and milk; and the net now and then plunged into the water. The animal, thus managed, has been known not only to live for a fortnight, but to grow exceedingly fat, and of a superior flavour. From this it would seem, that the want of moisture in the gills, is the chief cause of the death of these animals; and could that be supplied, their lives might be prolonged in the air, almost as well as in their own element.

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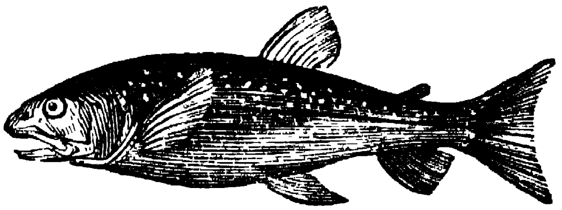
* The Bow-banded Chetedon. — The head of this curious fish is large; the eyes placed near the top, and small; the pupil black, iris gold yellow; the aperture of the gills is wide, and at the covert there is a spine. The lateral line is made up of small dots. The ground colour is brown; which towards the back inclines to black; and looks as if covered with velvet and inlaid with ivory: the tail is not divided. This species inhabit the coasts of Brazil, and other parts of South America; and grow from three to six inches in length

In winter, or the rainy seasons, they lie deep in holes near the shore, which they quit in spring to come into the shallows near the land; during the summer, when the sun in those climates blazes the whole day with irresistible fierceness, they keep at the depth of twenty or thirty yards, which protects them from its intense heat. They spawn in the coolest time of the year; and, being a lively fish, great numbers of the young fry are caught for the sake of being kept in vases, but in which they seldom come to maturity, and never increase. — Macloc's Natural History.

Yet it is impossible to account for the different operations of the same element upon animals, that, to appearance, have the same conformation. To some fishes, bred in the sea, fresh water is immediate destruction: on the other hand, some fishes, that live in our lakes and ponds, cannot bear the salt water.

But though there are some tribes that live only in the sea, and others only in fresh water, yet there are some whose organs are equally adapted to either element; and that spend a part of their season in one, and a part in the other. Thus the salmon, the shad, the smelt, and the flounder, annually quit their native ocean, and come up our rivers to deposit their spawn. This seems the most important business of their lives; and there is no danger which they will not encounter, even to the surmounting precipices, to find a proper place for the deposition of their future offspring. The salmon upon these occasions, is seen to ascend rivers five hundred miles from the sea; and to brave not only the danger of various enemies, but also to spring up cataracts as high as a house.* As soon as they come to the bottom of the torrent, they seem disap-



(The Salmon.)

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* Natural History of the Salmon.—The Salmon is a very prolific fish; both male and female are frequently fit for propagation during the first year of their age. The roe of the female is found, on an average, to contain from 17,000 to 20,000 ova or eggs. During the months of August, September, and October, the reproductive organs, both of the male and female salmon, have more or less completely reached maturity, at which period the instinct of propagation impels them eagerly to seek rivers, and to ascend nearly to their sources, in order to find a place suitable for the deposition of their spawn. They no longer, as in the winter and spring months, roam over the coast and shores, and return backwards and forwards with the flowing and ebbing of the tide, but pursue the most direct route by the mid-channel up the river, and make the greatest efforts to overcome every obstacle, either natural or artificial, that may impede their progress. The spawning is accomplished in the months of November, December, and January. When the parent fishes have reached the spawning ground, they proceed to the shallow water, generally in the morning, or at twilight in the evening, where they play round the ground two of them together. After a turn, they begin to make a furrow, by working up the gravel with their noses rather against the stream; as a salmon cannot work with his head down the stream, for the water going then into his gills the wrong way, drowns him. When the furrow is made, the male and female return to a little distance, one to the one, and the other to the other side, of the furrow. They then throw themselves upon their sides, again come together, and rubbing against each other, both shed their spawn into the furrow at the same time. This process is not completed at once; as the eggs of the roe must be excluded individually, and from eight to twelve days are required for completing the operation. When this process is over, they betake themselves to the pools to recruit themselves. The spawn thus deposited is afterwards covered with loose gravel; and, in this state, the ova remain for weeks, or sometimes much longer, apparently inert like seeds buried in the soil. In an early spring, the fry come forth early, and later when the spring is late. Generally, they begin to rise from the bed about the beginning of March, and their first movement is usually completed by the middle of April. The appearance which they present is that of a thick brand of grain rushing up in vast numbers. The tail first comes up, and the young animals often leave the bed with a portion of the investing membrane of the ovum about their heads. From experiments that were made upon the roe, it appears, that they can be only hatched in fresh water; for, when a portion of the roe was put into salt water, none of the ova ever came into life; and, when a young fish that had been hatched in fresh water, was put into salt water, it showed symptoms of uneasiness, and died in a few hours. When the evolution from the ova is completed, the young fry keep at first in the eddy pools, till they gain strength, and then prepare to go down the river, remaining near its sides, and proceeding on their way

pointed to meet the obstruction, and swim some paces back: they then take a view of the danger that lies before them, survey it motionless for some minutes, advance, and again retreat; till at last, summoning up all their force, they take a leap from the bottom, their body straight, and strongly in motion; and thus most frequently clear every obstruction. It sometimes happens, however, that they want strength to make the leap; and then, in our fisheries, they are taken in their descent. But this is one of the smallest dangers that attend these adventuring animals in their progress: numberless are the methods of taking them; as well by the hook, as by nets, baskets, and other inventions, which it is not our business here to describe. Their capture makes, in several countries, a great article of commerce; and being cured in several different manners, either by salting, pickling, or drying, they are sent to all the markets of Europe.*

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till they meet the salt water, when they disappear. The descent begins in the month of march, continus through April, and a part of May, and sometimes even till June. The reason why the fry thus descend by the margin in rivers, and the mid-channel in estuaries, is apparently, according to Dr. Fleming, because the margin of the river is the easy water, and consequently best suited to their young and weak state; but when they reach the estuary or tide way, then the margin of the water being the most disturbed, the fry avoid it, and betake themselves to the deepest part of the channel, disappearing alike from observation and capture, and so go out to sea. After remaining some weeks at sea, the smolts or samlets, as the fry are called, return again to the coasts and rivers, having attained a pound to a pound and a half of weight; by the middle of June they weigh from two to three pounds, and are said to increase half a pound in weight every week. They are now known in Scotland by the name of grilses, and by the end of the fishing season they have attained the size of seven or eight pounds. In the first five months of its existence, that is from April to August, both inclusive, it may be stated that the salmon reaches, in favourable circumstances, eight pounds weight, and afterwards increases, though more slowly, yet so as to have acquired the weight of thirty-five pounds in thirty-three months. After the process of spawning is completed in the river, the parent fish retire to the adjoining pools to recruit. In two or three weeks from that time, the male begins to seek his way down the river; the female remains longer about the spawning ground, sometimes till April or May. The fishes which have thus spawned are denominated *kelts*. In their progress to the sea, when they reach the estuary, they pursue a course precisely similar to the fry, not roaming about the banks like clean fish, but keeping in the mid-channel. They are at this time comparatively weak, and in thus betaking themselves to the deepest parts of the channel, they are better able to resist the deranging effects of the flood-tide, and to take advantage of the ebb-tide in accelerating their migration to the sea. It appears that some which descend as *kelts* in spring, return again in autumn in breeding condition, a recovery which is no less remarkable than the early growth of these animals. The sea seems to be the element in which the salmon feeds and grows. When caught in fresh water, not only is their condition comparatively poor, but scarcely anything is ever found in their stomachs. In estuaries and on coasts, on the other hand, they feed abundantly, and their stomachs are often found full of sand-eels.—EDIN NEW PHIL. JOURNAL.

* SALMON FISHERIES.—These are constant and copious sources of human food: they rank next to agriculture. They have, indeed, one advantage over every other internal produce, their increase does not lessen other articles of human subsistence. The salmon does not prey on the produce of the soil, nor does it owe its size and nutritive qualities to the destruction of compatriot tribes. It leaves its native river at an early state of growth; and going, even naturalists know not where, returns of ample size, and rich in human nourishment; exposing itself in the narrowest streams, as if nature intended it as a special boon to man. In every stage of savageness and civilization, the salmon must have been considered as a valuable benefaction to this country.

Being rarely caught, except in estuaries and rivers, the salmon may be considered in a great degree as private property. The London market, where the consumption is immense, is principally supplied from the Scotch rivers. The Tweed fishery is the first in point of magnitude of any in the kingdom; the take is sometimes quite astonishing, several hundreds having been frequently taken by a single sweep of the net! Salmon are despatched in fast sailing vessels from the Spey, the Tweed, the Tay, and other Scotch rivers, for London, packed in ice, by which means they are preserved quite fresh. When the season is at its height, and the catch greater than can be taken off fresh, it is salted, pickled, or dried for winter con-

As these mount up the rivers to deposit their spawn, others, particularly the eel, descend the fresh-water stream, as Redi assures us, to bring forth their young in the sea. About the month of August, annually, these animals take the opportunity of the most obscure nights, and when the rivers are flooded by accidental rains, seek the ocean. When they have reached the sea, and produced their young, for they are viviparous, they again ascend the stream, at different times, as opportunity offers, or as the season is favourable or tempestuous. Their passage begins usually about the end of January, and continues till towards the end of May, when they are taken in the river Arno by millions, and so small that a thousand of them go to a pound. There is nothing more certain than that they descend in our own rivers after floods, in great abundance, and are thus caught in nets, to very great advantage. They are possessed also of a power of climbing over any obstacle; for, by applying their glutinous and slimy bodies to the surface of the object they desire to surmount, they can thus creep up locks, weirs, and every thing that would prevent their ascending the current of the stream.

But the length of the voyage performed by these fishes, is sport, if compared to what is annually undertaken by some tribes, that constantly reside in the ocean. These are known to take a course of three or four thousand miles in a season; serving for prey to whales, sharks, and the numerous flocks of water-fowl, that regularly wait to intercept their progress. These may be called fish of passage, and bear a strong analogy to birds of passage, both from their social disposition, and the immensity of their numbers. Of this kind are the cod, the haddock, the whiting, the mackerel, the tunny, the herring and the pilchard. Other fish live in our vicinity, and reside on our coasts all the year round; or keep in the depths of the ocean, and are but seldom seen: but these, at stated seasons, visit their accustomed haunts with regular certainty, generally returning the same week in the succeeding year, and often the same day.

The stated returns, and the regular progress of these fish of passage, is one of the most extraordinary circumstances in all the history of nature. What it is that impels them to such distant voyages; what directs their passage; what supports them by the way; and what sometimes prompts them to quit, for several seasons, one shore for another, and then return to their accustomed harbour; are questions that curiosity may ask, but philosophy can hardly resolve. We must dismiss inquiry, satisfied with the certainty of the facts.*

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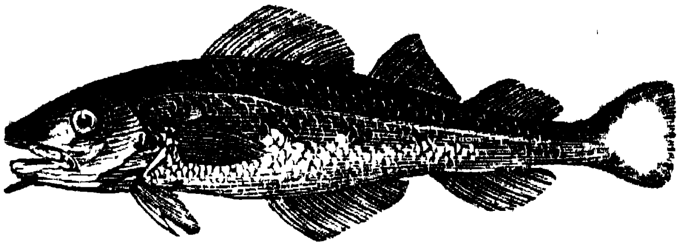
sumption at home, and for foreign markets. Formerly, such part of the Scotch salmon as was not consumed at home, was pickled and kitted, after being boiled, and was in this state sent up to London under the name of Newcastle salmon; but the present method of disposing of the fish, has so raised its value, as to have deprived all but the richer inhabitants in the environs of the fishery of the use of salmon. Within the memory of many now living, salted salmon formed a material article of household economy in all the farm houses in the vale of Tweed; insomuch that indoor servants used to stipulate that they should not be obliged to take more than two weekly meals of salmon. Its ordinary price was then 2*s*. a stone of 19lbs.; but it is now never below 12*s*., often 36*s*., and sometimes 42*s*. a stone. This rise in the price of the fish has produced a corresponding rise in the value of the salmon fisheries, some of which yield very large rents. The total value of the salmon caught in the Scotch rivers has been estimated at £150,000 a year There are considerable fisheries in some of the Irish and English rivers; but inferior to those of Scotland. — LOUDON'S ENCY. OF AGRICULTURE.

* MIGRATION OF FISHES.—Fishes appear to execute annually two great migrations By one of these shiftings, they forsake the deep water for a time, and approach the shallow shores; and by the other, they return to their more concealed haunts. These movements are connected with the purposes of spawning, the fry requiring to come into life, and to spend a certain portion of their youth in situations different from those which are suited to the period of maturity. It is in obedience to these arrangements that the cod and haddock, the mackerel and herring, annually leave the deeper and less accessible parts of the ocean, the region of the zoophytic tribes, and deposit their spawn within that zone of marine vegetation which fringes our coasts, extending from near the high-water mark of neap-tides, to a short distance beyond the low-water mark of spring tides. Amidst the shelter in this region, afforded by the groves of arborescent fuci, the young fish were wont, in com-



(The Cod-Fish.)

The cod seems to be the foremost of this wandering tribe; and is only found in our northern part of the world. This animal's chief place of resort is on the banks of Newfoundland, and the other sand-banks that lie off Cape-Breton. That extensive flat seems to be no other than the broad top of a sea mountain, extending for above five hundred miles long, and surrounded with a deeper sea. Hither the cod annually repair in numbers beyond the power of calculation, to feed on the quantity of worms that are to be found there in the sandy bottom. Here they are taken in such quantities, that they supply all Europe with a considerable share of provision. The English have stages erected all along the shore for salting and drying them; and the fishermen, who take them with the hook and line, which is their method, draw them in as fast as they can throw out. This immense capture, however, makes but a very small diminution, when compared to their numbers; and when their provision there is exhausted, or the season for propagation returns, they go off to the polar seas, where they deposit their roes in full security. From thence want of food forces them, as soon as the first more southern seas are open, to repair southward for subsistence. Nor is this fish an unfrequent visitant upon our own shores: but the returns are not so regular, nor does the capture bear any proportion to that at Newfoundland.*

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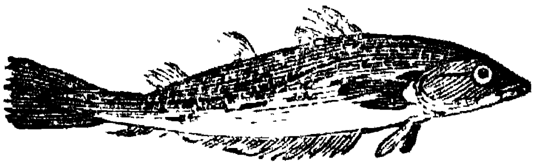
fort to spend their infancy; but since these plants have been so frequently cut down to procure materials for the manufacture of kelp, and the requisite protection withdrawn, the fisheries have suffered in consequence Even the finny tribes inhabiting lakes, as the gwinead and other species, periodically leave the deep water, and, in obedience to a similar law, approach towards the margin, and deposit their spawn. We may add that in the shallow water, in both cases, the numerous small animals reside, which constitute the most suitable food for the tender fry.

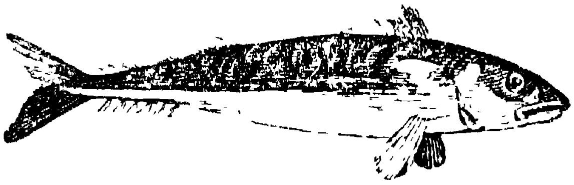
Many species of fish, as the salmon, smelt, and others, in forsaking the deep water, and approaching a suitable spawning station, leave the sea altogether for a time, ascend the rivers and their tributary streams, and having deposited their eggs, return again to their usual haunts. Even certain species of fish, inhabiting lakes, as the roach, betake themselves to the tributary streams, as the most suitable places for spawning.—Arcana of Science.

* Cod Fishery.—The extraordinary abundance of cod fish on the banks of Newfoundland was first discovered in 1536, and for the last two centuries the fishery has been principally prosecuted on them. A good many vessels are, however, employed on the coasts of Norway and of the Orkney and Shetland Islands, and on the Well-bank, Dogger-bank, and the Broad-fourteens. The English, Americans, and French are, at present, the nations by whom the fishery on the banks of Newfoundland is principally carried on. The American fishermen are remarkable for their activity and enterprise, sobriety and frugality; and the proximity of their country, and the various facilities which it affords for carrying on the trade, give them advantages against which it is difficult to contend. Cod is prepared in two different ways; that is, it is either gutted, salted, and then barrelled—in which state it is denominated green or pickled cod—or it is dried and cured—in which state it is called dry cod. Ready access to the shore is indispensable to the prosecution of the latter species of fishery.

Consumption of Cod.—About eight-tenths of the dried fish exported from Newfoundland by British subjects, are sent to Spain, Portugal, Italy, and other continental nations; the rest goes to the West Indies and Great Britain. It is doubtful whether the distant cod-fishery may not have passed its zenith. Spain, Italy, and other Catholic countries, have always been the great markets for dried fish: but the observance of Lent is becoming every day less strict; and the demand for dried fish will, it is most likely, sustain a corresponding decline. The relaxed observance of Lent in the Netherlands and elsewhere, has done more than any thing else to injure the herring fishery of Holland.

The haddock, the whiting, and the mackerel, are thought by some, to be driven upon our coasts rather by their fears than their appetites; and it is to the pursuit of the larger fishes, we owe their welcome visits. It is much more probable, that they come for that food which is found in more plenty near the shore, than farther out at sea. One thing is remarkable, that their migrations seem to be regularly conducted. The grand shoal of haddocks that comes periodically on the Yorkshire coasts, appeared there in a body on the 10th of December, 1766; and exactly on the same day, in the following year. This shoal extended from the shore near three miles in breadth, and in length for more than forty. The limits of a shoal are precisely known; for if the fishermen put down their lines at the distance of more than three miles from shore, they catch nothing but dog-fish: a proof that the haddock is not there.


(The Whiting)


(The Mackerel)*

* Mackerel.—This very beautiful fish is a native of the American seas, generally appearing at stated seasons, and swarming in vast shoals round particular coasts, but its great resort is within the Arctic circle, where it resides in innumerable troops, grows to a larger size than elsewhere, and is supposed to find its favourite food, which chiefly consists of marine insects, in far greater plenty than in warmer latitudes. When alive, from the elegance of its shape, and the extreme brilliancy of its colours, it is by far the most beautiful fish that frequents our coasts. Death, in some measure, impairs the colours, but it by no means obliterates them. Nature has decorated this fish with all the tints of the rainbow, and shows that her pencil is as vivid in the watery element, as in the playful beams of the tropical sun; but,

> " Who can paint
> Like nature! Can imagination boast
> Amid its gay creation, hues like hers?"

This splendid fish visits our shores in vast shoals, (a striking example of the bounty of Providence to man) in the months of May and June. The great mackerel fishery is on some parts of the west coast of England. This is of such an extent as to employ in the whole, a capital of near 200,000*l.* The fishermen go out to the distance of several leagues from the shore, and stretch their nets, which are sometimes several miles in extent, across the tide, during the night. The meshes of these nets are just long enough to admit the heads of tolerably large fish, and catch them by the gills. A single boat has been known to bring in, after one night's fishing, a cargo that has sold for 70*l.* In some places, they are taken by lines from boats as, during a fresh gale of wind, they readily seize a bait. It is necessary that the boat should be in motion in order to drag the bait (a bit of red cloth, or a piece of the tail of a mackerel) along, near the surface of the water. Dryden says,

> " They put up every sail,
> The wind was fair, but blew a *mack'rel gale*.

They are said to be fond of human flesh. Pontoppidan informs us that a sailor, belonging to a ship lying in one of the harbours on the coast of Norway, went into the water to wash himself, when he was suddenly missed by his companions. In the course of a few minutes, however, he was seen on the surface with vast numbers of these fish fastened on him. The people went in a boat to his assistance, and though, when they got him up, they forced with some difficulty the fishes from him they found it was too late; for the poor fellow very shortly afterwards expired. The roes of this fish are used in the Mediterranean for *caviare.* In the spring, their eyes are covered with a white film, that grows in the winter, and is readily cast at the beginning of the summer. During this time, they are said to be nearly blind.

> " Even Sunday shines no day of rest to them."

Alas! poor mackerel! and Gay says,

> " And when June's thunder cools the sultry skies,
> Ev'n Sundays are profan'd by *mack'rel* cries."

And some other poet has observed,

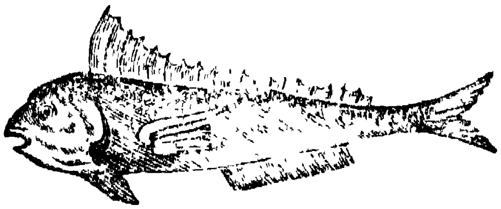
> " Law ordered that the Sunday should have rest,
> And that no nymph her noisy food should sell,
> Except it were new milk, or mackerel."

The celebrated *garum* of the Romans was a pickle prepared from this fish, which is still in fashion at Constantinople: it was formerly

But of all migrating fish, the herring and the pilchard take the most adventurous voyages. Herrings are found in the greatest abundance in the highest northern latitudes.* In those inaccessible seas, that are covered with ice for a great part of the year, the herring and pilchard find a quiet and sure retreat from all their numerous enemies: thither neither man, nor their still more destructive enemy, the fin-fish, or the cachalot, dares to pursue them. The quantity of insect food which those seas supply, is very great; whence, in that remote situation, defended by the icy rigour of the climate, they live at ease, and multiply beyond expression. From this most desirable retreat, Anderson supposes, they would never depart, but that their numbers render it necessary for them to migrate; and, as with bees from a hive, they are compelled to seek for other retreats.

(The Sprat.)†

For this reason, the great colony is seen to set out from the icy sea about the middle of winter; composed of numbers, that, if all the men in the world were to be loaded with herrings, they would not carry the thousandth part away. But they no sooner leave their retreats, but millions of enemies appear to thin their squadrons. The fin-fish and the cachalot swallow barrels at a yawn; the porpoises, the grampus, the shark, and the whole numerous tribe o dog fish, find them an easy prey, and desist from making war upon each other: but still more, the unnumbered flocks of sea fowl, that chiefly inhabit near the pole, watch the outset of their dangerous migration, and spread extensive ruin.



(The Butterfly Fish.)‡

In this exigence, the defenceless emigrants find no other safety but by crowding closer together, and leaving to the outmost bands the danger of being the first devoured: thus, like sheep when frighted, that always run together in a body, and each finding some protection in being but one of many that are equally liable to invasion, they are seen to separate into shoals, one body of which moves to the west, and pours down along the coasts of America, as

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* Migration of the Herring and Mackerel.—In a recent paper, Major W. M. Morrison supports that view of the migration of gregarious fish which leads to the supposition, that they do not actually travel from north to south, but that in accordance with climate, successive shoals approach the coasts for the purpose of spawning; and this view he supports by some interesting facts. The nets of Hastings are always cast north and south, in order that they may drift with the ebbing and flowing of the tide, which takes the direction of east and west in that part of the British Channel; and it is curious, that while those fish which are encumbered with roes, are caught in great numbers on the east side of the nets, they are not met with in a greater proportion than one in about one hundred without roes on the west side.

The Mackerel which are met with off Hastings, appear to be of a different species from those caught off Mount's Bay in Cornwall.

The fishermen of Cornwall, under the impression that the mackerel moved eastward along the coast, have endeavoured repeatedly, on their return, to meet them off the Praul Point, Portland Race, and off the Isle of Wight without success. With respect to the mackerel, his ideas do not appear to be very definite, and he questions whether they may not move north.—Arcana of Science.

† The Sprat.—The sprat is a native of the European seas, greatly resembling the herring, though a good deal smaller, and having thirteen rays in the back fin. They are caught in the Thames from the beginning of November till March, and afford a very seasonable relief to the poor of the metropolis.

Sprats are sometimes pickled, and rendered in flavour scarcely inferior to anchovies, from which they are only to be distinguished by their bones being indissoluble.

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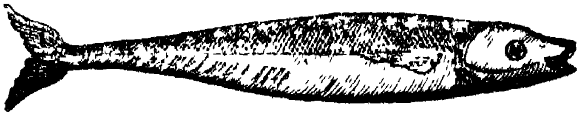
far south as Carolina, and but seldom farther. In Chesepeak Bay, the annual inundation of these fish is so great, that they cover the shores in such quantities as to become a nuisance. Those that hold more to the east, and come down towards Europe, endeavour to save themselves from their merciless pursuers by approaching the first shore they can find; and that which first offers in their descent, is the coast of Iceland, in the beginning of March. Upon their arrival on that coast, their phalanx, which has already suffered considerable diminutions, is nevertheless of amazing extent, depth, and closeness, covering an extent of shore as large as the island itself The whole water seems alive; and is seen so black with them to a great distance, that the number seems inexhaustible. There the porpoises and the shark continue their depredations; and the birds devour what quantities they please. By these enemies the herrings are cooped up into so close a body, that a shovel, or any hollow vessel put into the water, takes them up without farther trouble.


(The Anchovy.)

That body which comes upon our coasts, begins to appear off the Shetland Isles in April. These are the forerunners of the grand shoal which descends in June; while its arrival is easily announced, by the number of its greedy attendants, the gannet, the gull, the shark, and the porpoises. When the main body is arrived, its breadth and depth is such as to alter the very appearance of the ocean. It is divided into distinct columns, of five or six miles in length, and three or four broad; while the water before them curls up, as if forced out of its bed. Sometimes they sink for the space of ten or fifteen minutes, then rise again to the surface; and, in bright weather, reflect a variety of splendid colours, like a field bespangled with purple, gold and azure. The fishermen are ready prepared to give them a proper reception; and, by nets made for the occasion, they take sometimes above two thousand barrels at a single draught.

From the Shetland Isles, another body of this great army, where it divides, goes off to the western coasts of Ireland where they meet with a second neces-

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long, narrowed at the sides, and large: the eyes are large, prominent, with a black pupil and orange-coloured iris; the mouth is large: the jaws are of equal length, with a row of very narrow teeth standing close to each other; the tongue is broad, but short; the gills wide; the cheeks are large, and of a silver colour; the back is round, and of a dark green; the belly is short, but broad; the ground colour of the fish is a dirty green, with brown spots; there are some, however, whose principal colour is a clear blue. This fish inhabits the Mediterranean Sea; and at Marseilles Sardinia, and Venice, is common in the markets with other small fish. It attains the length of six or eight inches; the flesh is lean, and therefore not much esteemed. It lives near the shores, among the rocks and weeds, and feeds on crabs and small shell-fish. Its scales are hardly visible. Some naturalists describe this fish as having two dorsal fins, while others say it has but one; this contradiction must arise from these fins being sometimes united by a membrane, and sometimes not.—Macloc's Nat Hist.

* The Anchovy.—The anchovy is about three inches long, though mention is made of some being six inches and a half. The nose is pointed; the edge of the jaws finely serrated, the upper being longer than the under; the eyes are large; the body is round and slender; the back of a dusky green colour; the sides and belly of a silvery white: behind the ventral fins it has a long pointed scale; and the tail is forked.

At different seasons it frequents the Atlantic ocean and the Mediterranean sea, passing through the Streights of Gibraltar towards the Levant in the months of May, June, and July. The greatest fishery is at Gorgono, a small isle west of Leghorn, where they are taken at night in nests, into which they are allured by lights fixed to the stern of the vessels. When cured, their heads are cut off, their galls and entrails taken out, then salted and packed in barrels. It scarce needs to be mentioned, that, being put on the fire, they dissolve in almost any liquor. They are well tasted, when fresh But it has been found by experience, that anchovies taken thus by torch-light, are neither so firm, so good, nor so proper for keeping, as those that are taken otherwise.—Macloc's Nat. History.

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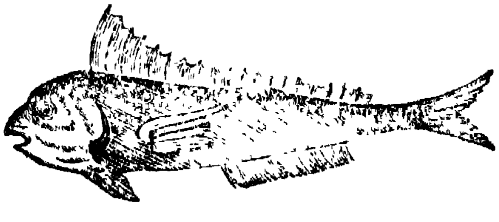

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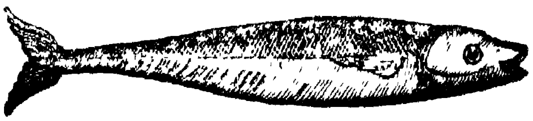
(The Anchovy.)

That body which comes upon our coasts, begins to appear off the Shetland Isles in April. These are the forerunners of the grand shoal which descends in June; while its arrival is easily announced, by the number of its greedy attendants, the gannet, the gull, the shark, and the porpoises. When the main body is arrived, its breadth and depth is such as to alter the very appearance of the ocean. It is divided into distinct columns, of five or six miles in length, and three or four broad; while the water before them curls up, as if forced out of its bed. Sometimes they sink for the space of ten or fifteen minutes, then rise again to the surface; and, in bright weather, reflect a variety of splendid colours, like a field bespangled with purple, gold and azure. The fishermen are ready prepared to give them a proper reception; and, by nets made for the occasion, they take sometimes above two thousand barrels at a single draught.

From the Shetland Isles, another body of this great army, where it divides, goes off to the western coasts of Ireland where they meet with a second neces-

long, narrowed at the sides, and large; the eyes are large, prominent, with a black pupil and orange-coloured iris; the mouth is large; the jaws are of equal length, with a row of very narrow teeth standing close to each other; the tongue is broad, but short; the gills wide; the cheeks are large, and of a silver colour; the back is round, and of a dark green; the belly is short, but broad; the ground colour of the fish is a dirty green, with brown spots; there are some, however, whose principal colour is a clear blue. This fish inhabits the Mediterranean Sea; and at Marseilles Sardinia and Venice, is common in the markets with other small fish. It attains the length of six or eight inches; the flesh is lean, and therefore not much esteemed. It lives near the shores, among the rocks and weeds, and feeds on crabs and small shell-fish. Its scales are hardly visible. Some naturalists describe this fish as having two dorsal fins, while others say it has but one; this contradiction must arise from these fins being sometimes united by a membrane, and sometimes not.—MACLOC'S NAT HIST.

* THE ANCHOVY.—The anchovy is about three inches long, though mention is made of some being six inches and a half. The nose is pointed; the edge of the jaws finely serrated, the upper being longer than the under, the eyes are large; the body is round and slender; the back of a dusky green colour; the sides and belly of a silvery white; behind the ventral fins it has a long pointed scale; and the tail is forked.

At different seasons it frequents the Atlantic ocean and the Mediterranean sea, passing through the Streights of Gibraltar towards the Levant in the months of May, June, and July. The greatest fishery is at Gorgono, a small isle west of Leghorn, where they are taken at night in nests; into which they are allured by lights fixed to the stern of the vessels. When cured, their heads are cut off, their galls and entrails taken out, then salted and packed in barrels. It scarce needs to be mentioned, that, being put on the fire, they dissolve in almost any liquor. They are well tasted, when fresh. But it has been found by experience, that anchovies taken thus by torch-light, are neither so firm, so good, nor so proper for keeping, as those that are taken otherwise.—MACLOC'S NAT. HISTORY.

sity of dividing. The one takes to the Atlantic, where it is soon lost in that extensive ocean; the other passes into the Irish sea, and furnishes a very considerable capture to the natives.

In this manner, the herrings, expelled from their native seas, seek those bays and shores where they can find food, and the best defence against their unmerciful pursuers of the deep. In general, the most inhabited shores are the places where the larger animals of the deep are least fond of pursuing, and these are chosen by the herring as an asylum from greater dangers. Thus, along the coasts of Norway, the German shores, and the northern shores of France, these animals are found punctual in their visitations. In these different places they produce their young; which, when come to some degree of maturity attend the general motions. After the destruction of such numbers, the quantity that attempts to return is but small; and Anderson doubts whether they ever return.*

Such is the account given of the migration of these fishes, by one who, of all others, was best acquainted with their history; and yet many doubts arise, in every part of the migration. The most obvious which has been made is, that though such numbers perish in their descent from the north, yet, in comparison to those that survive, the account is trifling: and it is supposed that of those taken by man, the proportion is not one to a million. Their regularly leaving the shore also at a stated time, would imply that they are not in these visits under the impulse of necessity. In fact, there seems one circumstance that shows these animals governed by a choice with respect to the shores they pitch upon: and not blindly drove from one shore to another. What I mean is, their fixing upon some shores for several seasons, or indeed, for several ages together; and after having regularly visited them every year, then capriciously forsaking them never more to return. The first great bank for herrings was along the shores of Norway. Before the year 1584, the number of ships from all parts of Europe that resorted to that shore, exceeded some thousands. The quantity of herrings that were then assembled there, was such, that a man who should put a spear in the water, as Olaus Magnus asserts, would see it stand on end, being prevented from falling. But soon after that period, these animals were seen to desert the Norway shores, and took up along the German coast, where the Hanse-towns drove a very great trade by their capture and sale; but, for above a century, the herrings have, in a great measure, forsaken them; and their greatest colonies are seen in the British channel, and upon the Irish shores. It is not easy to assign a cause for this seemingly capricious desertion: whether the number of their finny enemies increasing along the northern coasts,

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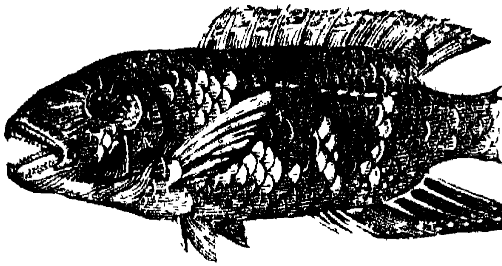
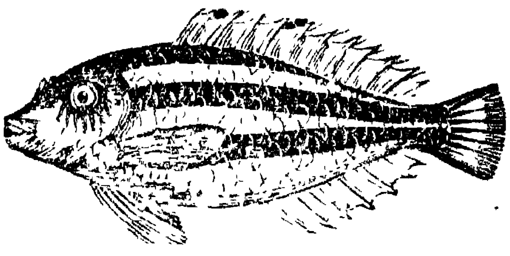
* IMPORTANCE OF THE HERRING FISHERY.—There is, perhaps, no branch of industry, the importance of which has been so much over-rated as that of the herring fishery. For more than two centuries, company after company has been formed for its prosecution, fishing villages have been built, piers constructed, boards and regulations established, and vast sums expended in bounties, and yet the fishery remains in a very feeble and unhealthy state. The false estimates that have been long current with respect to the extent and value of the Dutch herring fishery, contributed more, perhaps, than anything else, to the formation of exaggerated notions of the importance of this business. That the Hollanders prosecuted it to a greater extent, and with far greater success, than any other people is, indeed. most true. There is not, however, the shadow of a ground for believing that they ever employed as has often been stated, about 450,000 individuals in the fishery, and the employments immediately subservient to it. We question whether they ever employed as many as 50,000. At the time when the Dutch carried on the fishery to the greatest extent, the entire population of the Seven United Provinces did not certainly exceed 2,400,000; and deducting a half for women, and from a half to two thirds of the remaining 1,200,000 for boys and old men, it would follow, according to the statement in question, that every able bodied man in Holland must have been engaged in the Herring fishery! Had they been sifted ever so little, their falsehood would have been obvious; and we should have saved many hundreds of thousands of pounds that have been thrown away in attempting to rival that which never existed It would be impossible, within the limits of this note, to give any detailed account of the various attempts that have been made at different periods to encourage and bolster up the herring fishery. The grand object of the herring fishery "Board" has been to enforce such a system of curing as would bring British herrings to a level with those of the Dutch. In this, however, they have completely failed: Dutch herrings generally fetching double, and sometimes even three times the price of British herrings in every market of Europe. Neither is this to be wondered at. The consumers of Dutch herrings are the inhabitants of the Netherlands and German towns, who use them rather as a luxury than as an article of food, and who do not grudge the price that is necessary to have them in the finest order. The consumers of British herrings, on the other hand, are the negroes of the West Indies, and the poor of Ireland and Scotland. Cheapness is the prime requisite in the estimation of such persons; and nothing can be more absurd, than that a public Board should endeavour to force the fish curers to adopt such a system in the preparation of herrings, as must infallibly raise their price beyond the means of those by whom they are bought.

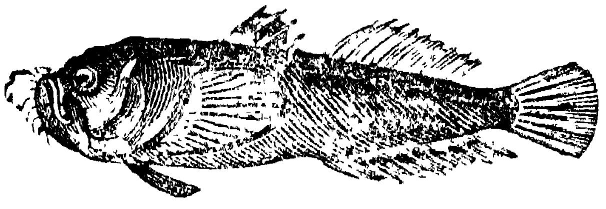
Of the 181,654 barrels of herrings exported from Great Britain in the year ending the 5th of April, 1830, 89,680 went to Ireland, 67,672 to places out of Europe (chiefly the West Indies), and 24,302 to places in Europe other than Ireland —M CULLOCH'S DICTIONARY OF COMMERCE.



(Streaked Gilt Head.)*



(The Parrot Fish.)†



(The Star Gazer.)‡

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* The Streaked Gilt Head.—The head of this fish is compressed, and bare of scales as far as the eyes; the mouth is large; the jaws are of equal length, with two strong canine teeth in front of each; the back teeth are flat, resembling the grinders of quadrupeds; the palate and tongue are smooth; the nostrils are single, and near the eyes; these last are small, with a black pupil in a blue iris: the aperture of the gills is wide, and the membrane mostly uncovered: the body is of a yellow colour, with six or seven brown, transverse stripes; the scales are broad thin, smooth, and extend over part of the anal, tail, and dorsal fins: the lateral line goes straight along the back to the end of the dorsal fin; it begins again about the middle of the tail, and is lost in the fin. This fish inhabits the shores of Japan, and the Red Sea.

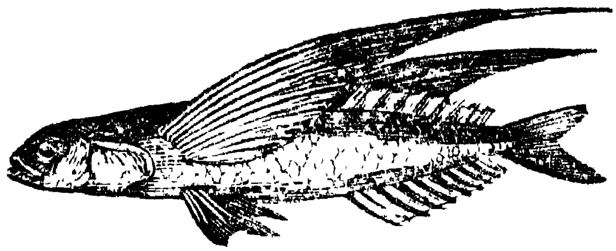
† The Parrot Fish.—The head of this fish is somewhat similar to the carp. The body is broad, the tail narrow: the ground colour is red, which is beautifully relieved by broad silvery stripes all along the body; the belly is white. The fins are small; the scales broad, thin, finely radiated, and very loose: the pectoral, tail, and ventral fins, are yellow at their origin, and grey at the extremities; and a kind of spine runs along the root of the ventral fin.

This species is found in both Indies; it takes its name from the Isle of St Croix at the Antilles, from whence a specimen of it was received.

‡ The Star Gazer.—The head is large, quadrangular, and covered with a rough helmet, which ends in two spines above, and in five smaller ones below: the mouth opens upwards; and when the lower jaw is removed, the tongue appears, which is thick, short, and strong, and full of small teeth. There is a membrane inside the lower jaw, terminating by a long filament; the fish opening its

may have terrified the herring tribe from their former places of resort; or, whether the quantity of food being greater in the British channel, may not allure them thither, is not easy to determine!

Happy England! where the sea furnishes an abundant and luxurious repast, and the fresh waters an innocent and harmless pastime; where the angler, in cheerful solitude, strolls by the edge of the stream, and fears neither the coiled snake, nor the lurking crocodile; where he can retire at night, with his few trouts, to borrow the pretty description of old Walton, to some friendly cottage, where the landlady is good, and the daughter innocent and beautiful; where the room is cleanly, with lavender in the sheets, and twenty ballads stuck about the wall! There he can enjoy the company of a talkative brother sportsman, have his trouts dressed for supper, tell tales, sing old tunes, or make a catch! There he can talk of the wonders of nature with learned admiration, or find some harmless sport to content him, and pass away a little time, without offence to God, or injury to man!†



(The Flying Fish.)*

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mouth, sets this in motion, which attracts little fishes, who endeavour to seize it, and are presently devoured: there are two barbles from each lip, which serve for the same purpose; and this fish often conceals itself among the sea-weed, leaving only the barbles visible, when watching for prey. There are two oval apertures in the upper jaw, and several little barbles in the lower; near each eye is a round aperture. The eyes lie quite at the top of the head, very close together, and prominent, as if staring upward: the pupil is black, iris yellow.

The star gazer inhabits the Mediterranean, lying in deep places near the shore. It seldom exceeds a foot in length, and lives on small fishes and worms.

* The Flying Fish.—The winged flying fish, if we except its head and flat back, has, in the form of its body, a great resemblance to the herring. It is generally nine inches long, and full four round at the thickest part. The skin is uncommonly firm, and the scales are long and silvery. The pectoral fins are very long; and the dorsal fin is small, and placed near the tail, which is forked: the eye, in consequence of the largeness of the head, is admirably situated for discovering dangers or prey; and when pushed out of the socket, which the fish can do considerably, its sphere of vision is greatly increased.

The flying fish inhabits the European, the American, and the Red Seas; but is chiefly found within the Tropics. The wings, with which they have the power of raising themselves into the air, are nothing more than large pectoral fins, composed of seven or eight ribs, or rays, connected by a flexible, transparent, and glutinous membrane; they have their origin near the gills, and are capable of considerable motion backwards and forwards; these fins are used, also, to aid the motion of the fish in the water; and if we may judge from the great length and surface of the oars, comparatively with the size of the body, the fish should be able to cut its way through the water with great velocity.

In flying, as it is termed, not only the wings and fins of this fish are much expanded, but also its tail; it skims along the surface of the deep somewhat in the manner of a swallow, but in straight lines; and from the blackness of its back, the whiteness of its belly, and forked expanded tail, it has much the appearance. It flies fifty or sixty yards at one stretch; and repeats the exertion again and again by a momentary touch on the surface of the water, which gives vigour for a new departure.

It has been inconsiderately remarked, that all animated nature seems combined against this little fish, and that it possesses the double powers of swimming and flying, only to subject it to greater danger; for if it escape its enemies of the deep, it is only to be devoured by the sea fowl, which are waiting its appearance in the air. Its destiny is, however, by no means, peculiarly severe: we should consider that, as a fish, it often escapes the attack of birds; and, in its winged character, it often throws itself out of the power of the aquatic race.

† Fish in British Streams, Lakes, and Ponds.—To an industrious Correspondent in that interesting and admirable Miscellany, the *Mirror*, we are indebted for the following pages on the fresh-water fish of Great Britain, which must be valuable, especially to the

disciple of Walton and lover of the rod, accompanied as it is with practical remarks on angling.—Ed.

There is no pursuit that unites a greater variety of exercise than angling: the robust and adventurous are required in some branches of this art to endure the utmost fatigue, as in salmon fishing, in particular; and to expose themselves to all sorts of inclemencies and inconveniencies in the attainment of their object. The fretful and irritable have been recommended to addict themselves to some of its gentler exercise, to learn the indispensable lessons of patience and self-denial; while the valetudinarian, the infirm, and the aged, may indulge themselves in float-fishing, and other branches of the art, which require little or no exertion. In a word, it is cheap, simple, and inexhaustible as a sport; calculated to relieve many a weary hour, in the ingenious preparations which it requires at home, and the extensive acquaintance with the works of nature that it presents abroad. A pursuit so innocent and so attractive cannot form an unacceptable subject for the readers of the *Mirror;* and it is for their amusement and instruction that I purpose in a few pages to present them with a short general description of the tackle the angler requires. 2. A detailed list or account of the fish usually taken by anglers in Great Britain; and, 3. With a Table, which will form a summary of the art, and in which various baits are included, not mentioned in the list.

Tackle for Angling.

In the choice of his *rod*, the angler will generally be directed by local circumstances. The cane rods are lightest, and where fishing-tackle are sold, they most commonly have the preference; but in retired country places, the rod is often of the angler's own manufacture, and he should, at any rate, be capable of supplying himself with one upon an emergency. No wood, as a whole, is better adapted for this purpose than the common hazel; and if to this he can add a sound ash stock, or butt-end, and a whalebone top, he is as well furnished with materials as he need desire to be. To prepare against accidents, let the young angler furnish himself, in the decline of the year, with six or nine wands of hazel, tapering towards the size of each other, in sets of three or four, and dry them in a chimney during the winter. On long excursions in the fishing season, a set of these wands will be a prudent addition to his baggage; and by sloping off their ends to the length of two inches, and fastening them together with shoemakers' thread, he will quickly form a useful rod. If he can varnish the whole over with India rubber, dissolved in linseed oil, with a small quantity of seed or shell lac, it will be an excellent preservative against the weather. A whalebone top is always an agreeable addition to a rod, but not an essential one. Salmon rods are sometimes wholly made of ash, with a whalebone top. Other rods may be formed thus:—a yellow deal joint of seven feet; a straight hazel of six feet; a piece of fine-grained yew, tapered to a whalebone top, and measuring together about two feet. Always carry a jointed rod, when not in use, tightly looped up.

The *line*, like the rod, should gradually diminish toward the further extremity; and no materials excel strong, clear horse hair. If you make it yourself, the hairs from the middle of the tail are best, and those of a young and healthy grey or white stallion; sort them well, that the hair of every link may be of equal size with each other; and if you wash them, do not dry them too rapidly. For ground-fishing, brown or dark hairs are best, as resembling the colour of the bottom. Silk lines are more showy than useful. They soon rot and catch weeds.

Your *hook* should readily bend without breaking, and yet retain a sharp point, which may be occasionally renewed by a whetstone. It should be long in the shank and deep in the bed; the point straight, and true to the level of the shank; and the barb long. From the difficulty of tempering and making them, few anglers ever undertake the task. Be careful to provide youself with a variety accordingly. Their sizes and sorts must, of course, entirely depend on the kind of fish for which you mean to angle.

Floats are formed of cork, porcupine quills, goose and swan quills, &c. For heavy fish, or strong streams, use a cork float; in slow water, and for lighter fish, quill floats. To make the former, take a sound, common cork, and bore it with a small red-hot iron through the centre, lengthways; then taper it down across the grain, about two-thirds of the length, and round the top, forming it, as a whole, into the shape of a pear. Load your floats so as just to sink them short of the top.

FISH USUALLY TAKEN BY ANGLERS IN GREAT BRITAIN.

Barbel—Directions for fishing for Barbel—Anecdote—Bleak—Bream—Bull Head—Carp.

The *Barbel*, so called from its four barbs, two of which are at the corners of its mouth, and the others at the end of its snout, is a heavy, dull fish, and gives very inferior sport to the angler, in proportion to its size and strength. The barbel begin to shed their spawn about the middle of April, and come in season about a month or six weeks after. In their usual haunts, among weeds, &c., they are fond of rooting with their nose like the pig. In summer, they frequent the most powerful and rapid currents, and settle among logs of wood, piles, and weeds, where they remain for a long time apparently immovable

—during the winter time, they return to deep bottoms. The most killing baits for the barbel are the spawn of trout, salmon, or, indeed, of any other fish, especially if it be fresh, respecting which, the barbel is very cunning; the pastes that imitate it must, therefore, be well made, and of fresh flavour. It is also an advisable plan to bait the water over night, by spawn or a quantity of cut worms. The barbel will also bite well at the cob-worm, gentles, and cheese, soaked in honey. The rod and line, with which you fish for barbel, must both be extremely long, with a running plummet attached to the latter, as they swim very close to the bottom. By a gentle inclination of the rod, you may easily ascertain when there is a bite; immediately upon which the fish should be struck, and seldom escapes, unless he break the line.

Sir John Hawkins mentions a curious anecdote relating to barbel fishing. Living, some years ago, in a village on the banks of the Thames, I was used, in the summer months, to be much in a boat on the river. It chanced that at Shepperton, where I had been for a few days, I frequently passed an elderly gentleman in his boat, who appeared to be fishing at different stations for barbel. After a few salutations had passed between us, and we were become a little better acquainted, I took occasion to inquire of him what diversion he had met with. "Sir," said he, "I have had but bad luck to-day, for I fish for barbel, and you know they are not to be caught like gudgeons!"—"It is very true," answered I; "but what you want in tale I suppose, you make up in weight"—"Why, Sir," says he, "that is just as it happens; it is true, I like the sport, and love to catch fish, but my great delight is in going after them. I'll tell you what, Sir," continued he, "I am a man in years, and have used the sea all my life (he had been an Indian captain), but I mean to go no more, and have bought that little house, which you see there, for the sake of fishing: I get into this boat (which he was then mopping) on a Monday morning, and fish on till Saturday night for barbel, as I told you, for that is my delight; and this I have done for a month together, and in all that while have not had a single bite!"

The *Bleak*, or *Blay*, is a common river fish, so called from its bleak or white appearance, that spawns in March, and is fond of many of the baits for trout. It is usually caught with a small artificial fly of a brown colour; and the hook should be suited in size to the fly. The bleak seldom exceeds six inches in length; its flesh is highly valued by epicures, and beads are made of its scales.

Bream shed their spawn about Midsummer, and although they are occasionally met in slow running rivers, are reckoned a pond fish, where they will thrive in the greatest perfection; and have been known to weigh from eight to ten pounds. In fishing for them, the angler should be very silent, and take all possible care to keep concealed from the fish, which are angled for near the bottom. His tackle must also be strong. This fish, according to Dr. Shaw, is a native of many parts of Europe, inhabiting the still lakes and rivers. and is sometimes found even in the Caspian Sea

Bull Head, or *Miller's Thumb*, is a small, ugly fish, which hides itself in brooks and rivers, under a gravelly bottom. They spawn in April, and their average length is from four to five inches. When their gill-fins are cut off, they serve as good baits for pike and trout, and, like the cray fish, when boiled, their flesh turns red.

Carp is a fish, that, by its frequency of spawning and quickness of growth, is greatly used to stock ponds, where it thrives better and lives longer than in rivers. Gesner speaks of one who lived to one hundred years old; there is much doubt about its general age, but it is supposed to be a very long-lived fish They spawn three or four times a-year, but the earliest time is about the commencement of May. They are observed to live uncommonly long out of water; and in Holland are frequently kept alive for three weeks, or a month, in a cool place, by being hung with wet moss in a net, and fed with bread steeped in milk In angling for carp, it is necessary to make use of a strong tackle, with a fine gut next the hook, and a float formed of the quill of a goose. They bite almost close to the bottom, and are rarely caught if angled for in a boat From its subtlety, it has been sometimes called the water-fox.

The river carp is accustomed to haunt, in the winter, the most quiet and broad parts of the stream. In summer they live in deep holes, reaches, and nooks, under the roots of trees, and among great banks of weeds, until these are in a rotten condition. The pond carp loves a rich and fat soil, and will seldom or never thrive in cold, hungry waters. The carp ponds of Germany yield a considerable income to the gentry.

Chub—Dace—Eel—Pinnock—Grayling—Gudgeon—Loach—Minnow.

The *Chub*, or *Chevin*, is, like the perch, a very bold biter; and will rise eagerly at a natural or artificial fly. They spawn in June, or at the latter end of May, at which time they are easily caught by a fly, a beetle with his legs and wings cut off, or still more successfully by a large snail. When they are fished for at mid-water, or at bottom, a float should be made use of; when at top, it is customary to dib for them, or to use a fly, as if a trout were the angler's object. Strong tackle is also requisite, as they are a heavy fish, and usually require a landing-net to pull them out. Their average length is from ten to fourteen inches. This fish is the squalus of Varro, and very common throughout England, and the Eastern United States.

Dace. Dart, or *Dare*, are a very active and cautious fish, and rise to a fly, either real or artificial. It is necessary in angling for them to remain in concealment as much as possible. They spawn in February and March, and they are but inferior in point of flavour. They frequent gravelly, clayey, and sandy bottoms, leaves of the water-lily, and deep holes, if well shaded. In sultry weather they are frequently caught in the shallows; and during that period are best taken with grasshoppers or gentles. In fishing at the bottom for roach or dace, which are similar in their haunts and disposition, bread, soaked in water and kneaded to a good consistency, and then made up together with bran into round balls, and thrown into the place where it is proposed to angle, will be found very serviceable, but must always be thrown up the stream. There is a mode of intoxicating dace, and by this means rendering them an easy prey, but this is no part of the real angler's sport. The Thames is well known to abound in dace; and the graining of the Mersey is thought to be a variety of the same species.

The *Eel* is rarely angled for, but it is usually caught by the process of sniggling or bobbing with night lines, &c. Being fond of quiet in the day-time, all who expect much sport in eel-fishing must devote their evenings, and even whole nights, to the pursuit. The method of sniggling for eels is as follows:—Take a common needle, attached in the middle by fine waxed twine to a pack-thread line, or a strong, small hook fixed to this kind of line; place a large lob-worm, by the head end, on your needle or hook, and draw him on to his middle; affix another needle to the end of a long stick, and guide your bait with it into any of the known haunts of the fish, between mill-boards, or into clefts of banks or holes, holding the line in your hand; now give the eel time to gorge the bait, and then, by a sharp twitch, fix the needle across his throat, or the hook into his body; tire him well, and your triumph is certain. Although this is not strictly a method of angling, the lovers of that sport will find it so successful a mode of diversifying their pursuits, where eels are common, that the present appeared the most convenient place to insert it. Bobbing is a rough species of angling. The best method is to provide yourself with a considerable number of good-sized worms, and string them from head to tail, by a needle, on fine strong twine, viz., to the amount of a pound or a pound and a half in weight. Wind them round a card into a dozen or fifteen links, and secure the two ends of each link by threads. Now tie a strong cord to the bundle of string worms, about a foot from which put on a bored plummet, and angle with a line from two to three feet long, attached to a stout tapering pole. Eels, and perhaps pike, are found in no part of Great Britain in such numbers or variety as in the marshy parts of the counties of Cambridge and Lincoln. Of two rivers of the latter, it is said, in an old proverb—

> "Ankham eel, and Witham pike,
> In all England is none like."

And a considerable district of the former is supposed to have been called after the fish of which we are now treating, the Isle of Ely; from which, says Fuller, the courts of the kings of England were anciently supplied with eels. The silver eel is the finest, and is very common in Scotland.

The manner in which this fish is propagated has long been a matter of dispute. They have neither spawn, melt, nor known organs of generation. Walton gravely argues for their being bred of corruption, "as some kind of bees and wasps are;" others strongly contend for their being viviparous. It is a subject, indeed, upon which naturalists have no certain information. Eels bite in a shower, and in windy, gloomy weather, at the lob and garden worm, designed for other fish, particularly trout. Unlike other fish, they are never out of season. They are a very greedy fish; and if you wish to angle for them in the ordinary way, they will take a lamprey, wasp, grubs, minnows, &c.; but particularly the first.

The *Pinnock*, or *Hirling*, is a species of sea-trout, which usually attains the length of from nine to fourteen inches, and is principally known in Scotland; the whitling, another species, is from sixteen to twenty-four inches long. They will both rise equally at an artificial fly, but require generally a more showy one than the common trout.

The *Grayling*, or *Umber*, spawns in May, and is in the best condition in November. They will greedily take all the baits that a trout does, and frequent the same streams. They are said to have the fragrant smell of the plant thymallus. Their average length is from sixteen to eighteen inches; and they must be angled for with very fine tackle, as they are a remarkably timid fish. When hooked, they must also be cautiously worked, as the hold in their mouth easily gives way; but they will speedily return to the bait. It is fine eating; unknown to Scotland or Ireland.

The *Gudgeon* is a fish in some request, both for its flavour and the sport it affords to the inexperienced angler. It is very simple, and is allured with almost any kind of bait. It spawns two or three times during the year, is generally from five to six inches long, and fond of gentle streams with a gravelly bottom. In angling for gudgeon, the bottom should be previously stirred up as this rouses them from a state of inactivity, and collects them in shoals together. Some anglers use two or three hooks in gudgeon-fishing. A float is always used, but the fish should not be struck on the first motion of it; as they are accustomed to nibble the bait before they swallow it. It frequently happens that, in angling for gudgeons, perch are caught.

The *Loach*, or *Groundling*, sheds its spawn in April, and remains in the gravel; where they are usually caught with a small red worm. They are principally found in the north of Great Britain, and in the streams of the mountainous parts. They are about three inches in length; and their flesh is pleasant and wholesome. This fish is recommended by Gesner, and other learned physicians, as very nourishing and extremely grateful to the palate and stomach of sick persons.

The *Minnow*, or *Minim*, one of the smallest river fish, seldom exceeds two inches in length. They spawn generally about once in two or three years, and swim together in shoals, in shallow waters, where they are very free and bold in biting. They serve also as excellent baits for pike, trout, chub, perch, and many other fish, which prey upon them and devour them greedily.

The Par, or Samlet—Perch—Pike—Pope —Roach, and Rud.

The *Par*, or *Samlet*, is a fish that is known by different names in different parts of Great Britain. On the river Wye it is usually called a skirling; in Yorkshire, a brandling; in Northumberland, a rack-rider; and in some parts of England, a fingering, from the resemblance of its spotted streaks to the human fingers. Par, or samlet, is its Scottish name, and in that part of Britain it is best known. Some have affirmed, that it is the blended spawn of the trout and salmon. This opinion is strengthened by the circumstance of their usually frequenting the same haunts with the salmon and sea-trout, and their being forked in their tail like the former.

The *Perch* is a very bold biting fish, and affords excellent amusement to the angler. He is distinguished by the beauty of his colours, and by a large erection on his back, strongly armed with stiff and sharp bristles, which he can raise or depress at pleasure. Defended by this natural excrescence, he bids defiance to the attacks of the ravenous and enormous pike, and will even dare to attack one of his own species. Perch spawn about the beginning of March, and measure from eight to fourteen inches. In fishing for perch with a minnow, or brandling, the hook should be run through the back fin of the bait, which must hang about six inches from the ground. A large cork float should be attached to the line, which should be leaded about nine inches from the hook. It must be observed that they invariably refuse a fly.

The *Pike*, *Luce*, or *Jack*, is a fish of enormous size, and the greatest voracity; indeed, so notorious is he for the latter quality, as to have gained the appellation of the fresh-water shark. They are also great breeders. According to a common but fallacious account, they were originally brought to England about the reign of Henry VIII. They were certainly at that time considered as great rarities. Their usual time of spawning is about March, in extremely shallow waters. The finest pike are those which feed in clear rivers; those of fens or meres being of very inferior quality. They grow to a vast size in these last-mentioned places, where they feed principally on frogs, and such-like nutriment. They are reckoned to be the most remarkable for longevity of all fresh-water fish; are solitary and melancholy in their habits, generally swimming by themselves, and remaining alone in their haunts, until compelled by hunger to roam in quest of food. A high wind, or a dark, cloudy day, promises the best sport in angling for this fish; as their appetite is keener at those periods.

There are three modes of catching pike: by the ledger, the trolling, or walking bait, and the trimmer. The ledger is a bait fixed by a stick driven into the ground, in one particular spot, or the angler's rod may be so secured; a live bait is attached to the hook, such as dace, gudgeon, or roach; and, if a frog is made use of, the largest and yellowest will be found the most tempting. Sufficient line must be left free to allow the pike to carry the bait to his haunts. When fish are used as baits, the hook must be securely struck through the upper lip; and the line should be between twelve and fourteen yards in length. If a frog should be made use of for a bait, the arming wire of the hook should be put in at the mouth, and out at the side, and the hinder leg of one side should be fastened to it with strong silk. The second method, or trolling for pike, is the most general, and, at the same time, the most diverting way of catching them. There are several small rings, which are fixed to each joint of the trolling-rod; and on the bottom and thickest joint a reel is placed. To this reel twenty or thirty yards of line, according to the option of the angler, are not uncommonly attached; the line passes through each ring of the rod, and is then joined to the gymp, or wire, to which the hook, or hooks, are suspended. Two large hooks are used, about the size adapted to perch-fishing, which are placed back to back. There is also a little chain, which hangs between the two hooks, and at the end of this chain is a leaden plummet, sewn, or fastened in some secure way, into the mouth of a dead fish, and the hooks are left exposed on the outside. The bait, when it is thus fastened, is constantly moved about in the water; that, by the continuance and variety of its movements (being sometimes raised, and sometimes kept sinking), now going with the stream, now against it, the resemblance to life may appear more striking and probable. The pike, if he be near, no sooner perceives this bait, than he immediately darts at it with velocity, supposing it to be a living fish, and drags it with him to his hole, where, in about ten or twelve minutes, he voraciously devours it, and implants the two hooks in his body. When he is thus secured, you must allow him ample time to fatigue and weary himself, then drag him slowly and carefully to shore, and land him with your net, being cautious of his bite.

The third mode by which pike are occasionally caught, is by the trimmer, a small wooden cylinder, round which, about the middle, in a small diameter, twenty or thirty yards of strong platted silk, or packthread, are wound. A yard, or perhaps more, as occasion suits, is suffered to hang down in the water, tied to the armed wire of a hook, constructed for the purpose, and baited with a living fish, commonly a roach. The trimmer is now permitted to go wherever the current drives it, and the angler silently follows, until a fish has poached the bait, when he comes up and secures his prey, and retires with it to the reeds, near the shore. Whatever fish are made use of in catching pike, they should be fresh, and preserved in a tin kettle, the water of which, if changed frequently, will considerably improve them.

It may be noted in this place, that pike are denominated jack until they have attained the length of twenty-four inches: their usual haunts are shady, still, unfrequented waters, near which are dark, overhanging boughs, and abundance of weeds; they are also to be met with in standing waters or ditches, which are partly overspread with that green, slimy substance, which is better known by the name of duck-weed. In such places he is sometimes discovered at the top, and occasionally in the middle of the water; but in cold weather he is almost always at the bottom.

The *Pope*, or *Ruff*, is a fish very similar in its nature and appearance to the perch; and is frequently caught when fishing for the latter. They spawn in March and April, and are taken with a brandling, gentles, or caddis. They are extremely voracious in their disposition, and will devour a minnow, which is almost as big as themselves. In their favourite haunts of gentle, deep streams, overhung by trees, they swim in shoals together; and you may fish for them either at the top or the bottom of the water, as they are known to bite in almost any weather, and in any situation. Their average length is from six to seven inches.

Roach are frequently taken with flies under water. They will bite at all the baits which are prepared for chub or dace, and are considered a simple and foolish fish. They spawn in May, and turn red when boiled. The compactness of their flesh gave rise to the proverb—"Sound as a roach." The roach haunts shallow and gentle streams, and the mouths of small streams which run into larger ones. In angling for roach, the tackle must be strong, and the float large and well leaded.

The *Rud*, or *Finscale*, is a very scarce fish, found only in the river Cherwell, in Oxfordshire, and a few of the lakes of Lincolnshire and Yorkshire. It sheds its spawn in April, will take all kinds of worms, and will rise at an artificial float. Its colour is a kind of yellowish brown, and its average length from nine to fifteen inches.

Salmon—Smelts—Stickleback—and Tench.

Salmon are accustomed to quit the fresh waters, and retire into the sea at the approach of winter, which, at the commencement of April, they usually leave for rivers: but the Wye and Usk, in Monmouthshire, and the Exe, in Devonshire, have them in season during the six wintry months. The finest species are caught in the Exe, Thames, and Tamar; but not so abundantly as in many other places. Salmon prefer more chilly streams, and are consequently found in greater numbers northward, in the rivers of Scotland, particularly in the Tweed, the Tyne, the Clyde, and the Tay. In the latter, they occasionally are found of the weight of 70 pounds; and in the Tweed and Clyde of about 50 or 60 pounds weight. They appear some time in the rivers before they are in a healthy state; and the best season for the angler to commence his operations, is, in the close of the month of May, or the early part of June. The usual time for the salmon to deposit their spawn, is from the 1st of September to the latter end of October, when they grow very sickly both in appearance and flavour. Previous to this, they generally retire to brooks which branch out irregularly from the main river, or remain in shallows, where they sometimes are scarcely covered with water. Here they fabricate a kind of trough, in the gravel, as a depository for the eggs of the female, over which the male sheds a fluid of a white appearance. On the completion of this task, the male and female unite to cover the whole with gravel, and conceal it with the greatest industry. The male is so diligent in accomplishing his share of the formation and subsequent concealment of the trough, that he frequently fatigues himself to death; and is always much longer in recovering his original state of health than the female.

The vivification of the secreted spawn usually occurs about the commencement of April, when the sun has acquired sufficient strength to warm the bottom parts of the shoals in which it is deposited. It takes place with considerable rapidity; and, when the shoals are swelled by the spring floods, the young fry intuitively (or, probably, from an inability to withstand the force of the torrents) hurry downward to the sea. In the course of the summer, generally during the months of July and August, they return to the same rivers which they left in the spring, and continue until the commencement of December, when they re-visit the sea; and upon their return to the fresh waters after their last emigration, they attain the size, appearance, and flavour of genuine salmon. It appears, that these fish are forced from their salt water residence by an insect, which adheres closely to their body (called by fishermen, the sea-louse,) and which gradually drops off on their return to the rivers. It is, also, exceedingly remarkable, that they rarely or never forsake their parent streams. From this period, salmon are subject to a gradual decline of their strength, health and appearance; their heads grow very large: their skin acquires a dirty colour, widely different from the silvery appearance which pervaded them on their first entrance into the rivers; their flesh is loose and insipid; their scales look as if they had been almost rubbed off; and their gills are dreadfully infested by the lernea salmonea In this state they are called shotten salmon. On their departure for the sea, their debility is so excessive, that they make frequent stops, in still waters during their passage, and are a long time in reaching the object of their destination. The male shoots out a gristly excrescence from the lower jaw, which sometimes penetrates through the upper, and resembles the beak of a bird.

Salmon are greatly delighted with rivers which take their rise in mountainous districts, and a deep gravelly bottom, which is totally clear of any kind of slime or filth, that may impregnate the water, and sully its crystal clearness. They also uniformly avoid streams which flow upon ore, or among calcareous formations of any kind. In summer, where the warmth is most intense, they occasionally seek the shelter of trees and other shrubs, but rarely continue long under their protection. They appear remarkably sensible of the vicissitudes of the weather; and are frequently observed to leap about, as if rejoicing in the prospect of an approaching shower. To thunder storms, however, they have a great antipathy; every peal appears to affect them, and induces them to seek a closer shelter at the bottom of the rivers.—During their residence in fresh water, it is a well-authenticated circumstance, that they always lie with their heads pointing up the river; and never swim down the stream, unless during the period of their emigration to the sea, or when their position is molested. This "dainty and wholesome fish," says old Fuller, "is a double riddle in nature:—first, for its strange leaping, or flying rather, so that some will have them termed salmons à saliendo. Being both bow and arrow, it will shoot itself out of the water an incredible height and length; secondly for its invisible feeding, no man alive having ever found any meat in the maw thereof." Some few instances, however, have been related, of sprats, and other small fish, having been discovered in their stomachs during their residence in the sea, or when they have been caught on the friths or headlands. The salmon leap is, indeed, an extraordinary exertion. Erecting themselves on their fins, as if to survey the obstacle before them fully, these fish will crowd to the bottom of a fall of 10 or 12 feet perpendicular, and taking advantage of the first flood or flush of water that will assist them, they spring up the precipice with the greatest confidence; and though frequently unsuccessful in a first attempt, they renew it with ardour, until they have reached the summit. There is a cataract in Scotland on the river Erich, called the Keith, of 13 feet fall, where the whole stream enters through a cleft of a few feet broad, which the salmon uniformly leap.

Having thus briefly premised the general character, size, haunts, &c. of the salmon, we must proceed to the artifices best adapted for his capture.—The primary and most important articles with which the angler for salmon should be provided are rods, reels, and artificial flies, a bait to which the salmon is much attached. The length of the rod should be from 17 to 20 feet, which, however, can be regulated according to the breadth and general size of the river in which the angler pursues his operations. The reel, which, on these occasions, forms the most material appendage to the rod, is made of brass: it should be constructed with the utmost nicety, and capable of the swiftest circumvolutions. The line, which is fastened to the reel, may be composed either of strong silk or twisted horse-hair, gradually diminishing at the top, and having a loop at the end of the wheel, and another at the cast lines, to fasten them to each other. Let this cast line be very carefully twisted with the fingers, and shorter than the rod, so that none of the knots may come within the top ring; sixteen to twenty horse hairs may be used in the upper links, but they must be diminished toward the hook, where they are best made of three small, round, twisted silk-worm guts, or a few strong horse hairs. The artificial flies should be generally of large dimensions, and of a gaudy and glittering colour. The materials that compose them are hairs, furs, and wools, of every variety that can be collected, mingled with the tail feathers of cocks and game, and secured together by plated wire, or gold and silver thread, marking silk, shoemakers' wax, bees' wax, &c. Their wings may be made of the feathers of domestic fowls, or any others of a showy colour. Imitate principally the natural flies that will be recommended hereafter; but you may safely indulge your fancy, rather than depart without a bite: for many anglers succeed with the most monstrous and capricious baits of this kind. A raw cockle, or muscle, taken out of the shell, prawns, and minnows have also been recommended as salmon bait. The mode of angling with these is to drop the line, which must be totally unencumbered with shot, into some shallow which approximates to the edge of a hole of considerable depth, and in this situation to suffer it to be carried in by the current. The noviciate in angling will, at first, experience considerable difficulty in throwing his line to any great extent. For this we can give no recipe, but a most inflexible determination to proceed, and the most consummate patience in disappointment. It should always be thrown across the river, and on the off-side from the spot where you expect the fish to rise. When you imagine that the salmon has been struck, be cautious in giving him time sufficient to enable him to poach his bait, that is, to swallow it firmly and securely. After this, fix the hook firmly in him by a gentle twitch. On the first sensation of this pain, the salmon will plunge and spring with great violence, and use every endeavour of strength and cunning to effect his escape. He will then, perhaps, run away with a considerable length of line, which is to be kept in a gently relaxed situation, so that it may always yield with facility to his obstinate resistance: nor can you give him too much line, if you do but clear it of weeds and incumbrances. If he now become sullen and quiet in the water, rouse him gently by flinging in a few stones; and when he once more commences resistance, do not be too eager in checking his career, but let him gradually exhaust himself of his strength; follow him down the stream, or allow him to cross it; while, at every opportunity, you keep winding up your line, until you approach him in this wearied state, and take him softly by the gills out of the water.

The *salmon peal* may be caught in the same manner: he is smaller than the salmon, and seldom exceeds fourteen or fifteen inches in length. Before we conclude this account of the salmon, we may remark, that a fresh wind after a flood, and when the sun shines watery, is the best weather for catching them —or when the water is slightly urged by the tide; but it must not be thick or muddy.

Smelts are more properly a sea-fish, and not often caught with a rod and line in rivers; but, when this is attempted, they rise to any piece of smaller fish on a Paternoster line, or one that is armed with many hooks, at a small distance from each other. A remarkable abundance of smelts occurred in the Thames, in the year 1720, at which time women and children lined the banks to angle for them, between London and Greenwich.

The *Stickleback* is a small prickly fish, that serves well as baits when the prickles are cut off. It spawns in May, on aquatic plants, and is found in rivers, ponds, and ditches. Trout and pike will rise eagerly at them; and this is the only purpose for which they are caught.

Tench, like the carp, are generally considered pond fish, although they have been frequently caught in the river Stour. They shed their spawn about the commencement of July, and are in season from September to the latter end of May. They will bite very freely during the sultry months. Their haunts are similar to those of the carp, except that they frequent the foulest and muddiest bottoms, where they may shelter themselves among an infinite quantity of reeds; hence you must angle for them very near the bottom, and allow them sufficient time to gorge the bait. Use strong tackle, and a goose-quill float without a cork. The general length of the tench is from twelve to fourteen inches; though some have been occasionally caught which weighed upwards of ten pounds; such occurrences, however, are very rare.

Trout.—Trout is considered as one of the finest river fish that this country can produce. Its colours are beautifully varied at different seasons of the year, and according to the rivers it frequents.

They abound in the generality of our streams, rivers, and lakes, and are usually angled for with an artificial fly. Their weight also differs from half a pound to three; some few have been caught which weighed upwards of four pounds. Trout are extremely voracious; and, by their activity and eagerness, afford famous diversion to the angler. They are remarkable for coming to their size quicker than any other fish, though they fatten slow; as also for being very short-lived. They die when taken out of water sooner than any other with which we are acquainted. Previous to their spawning, they are observed to force a passage through weirs and flood-gates against the stream; and how they are enabled to overcome some of these impediments is a subject of much conjecture. Their general time of shedding their spawn is about October or November: in some rivers, however, it is much sooner, in others later. They are also met with in eddies, where they remain concealed from observation behind a stone, or log, or a bank that projects into the stream: during the latter part of the summer, they are frequently caught in a mill-tail, and sometimes under the hollow of a bank, or the roots of a tree.

In angling for trout, there are many things worthy of particular observation:—1st. That the day, on which the sport is undertaken, be a little windy, or partially overcast; and the south wind is superior to all others, if it do not too much disturb your tackle. 2nd. The sportsman should remain as far as possible from the stream, fish it downwards, the line never touching the water, as the agitation proceeding from the fall might disturb the fish, and preclude all possibility of capturing them. 3rd. Clear streams are famous for sport; and in fishing in them, a small fly with slender wings must be attached to the hook. When the water is thick, and the sight more imperfect from this disadvantage, a larger species of bait must of necessity be used. 4th. The line should, on an average, be about twice as long as the rod, unless in cases of emergency, when the number and variety of trees exclude the probability of a successful throw, if at any distance. 5th. Let the fly be made to suit the season. After a shower, when the water becomes of a brown appearance, the most killing bait is the orange-fly; in a clear day, the light-coloured fly; and, on a gloomy day, in overshadowed streams, a dark fly. It is hardly necessary to add, that the angler, particularly in fly-fishing for trout, cannot be too quick in perception, or too active in striking on the first rise of the fish.

The trout may be caught at the top, the middle, or the bottom of the water. In angling for him at the top, with a natural fly, use the green-drake and the stone-fly; but these two only during the months of May and June. The mode of fishing in this way is called dipping, and is thus performed:—If there be little or no wind to disturb your tackle and agitate the surface of the stream, make use of a line half the length of the rod. If there be a wind, increase the length of the line by one half. Let the line fly up or down the river, according to the direction of the wind; and when you are aware of the rise of a fish, guide the fly over him, as in case of striking him, you have no length of line with which to weary him: the capture must be effected by main force; and if the tackle is sufficiently strong to resist the struggles of the fish, the angler, after a short contest, may insure himself a triumph. Trout-angling at mid-water is effected by means of a small minnow, or with a caddis-grub, or any other species of worm. In angling with a minnow, the moderately-sized and whitest ones will be found to be the most killing bait. It should be placed upon a large hook, to enable it to turn about when drawn against the stream; consequently the hook should be inserted in the mouth, and drawn out of the gills, or, perhaps, three or four inches beyond it would be necessary. It should be again drawn through the mouth with the point to the tail of the minnow; this finished, the hook and bait should be tied neatly together, by which means the evolutions of the bait will be more effectually, and at the same time more naturally, performed. The slack of the line should then be pulled back, so that the body shall be nearly straight on the hook. If the minnow do not turn nimbly enough for your purpose, let the bait be moved a little to the right or to the left, as occasion shall direct; which process, by inlaying the orifice made in the body of the minnow, will greatly facilitate its movements. Some have preferred the loach, as a bait, to the minnow; by those who are nice in these matters, the same precautions in attaching it should be scrupulously observed. In angling with a worm or caddis, a cork float and the finest kind of tackle must necessarily be made use of, as the success of the young practitioner, in this enchanting amusement, will greatly depend on his choice of articles. In muddy waters, the lob-worm is considered the best bait; in clear streams, the brandling: the first is generally used for large trout; the second, where smaller ones are expected.

There are two methods of angling at bottom, either with a cork, or any other kind of float, or with the hand. The best way of angling with the hand, is by means of a ground bait, and a long line, which should have no more than one hair next the hook, and just above it one small spot for a plumb; the hook should be small, and the brandling well secured, and only one fastened on at a time; thus the worm must always be kept in motion, and drawn towards the person who is fishing. The best mode of angling at bottom, with a float, is with a caddis, which may be put upon the hook two or three at the same time; the caddis is sometimes advantageously joined to the worm, and occasionally even to an artificial fly, which should be placed upon the hook, so as merely to cover its points; the finest kind of tackle must be used in this experiment, and it is generally reputed a very killing bait, for either trout or grayling, at all seasons of the year. It is moreover a very common method to angle with a caddis at the top of the water. The caddis may be easily imitated by forming the head of the insect of black silk, and the body of yellow chamois leather. It must be remarked, however, that the trout will seldom or never rise at a caddis when the stream is impregnated with mud.

A Table of the Fish usually Angled for in the Waters of Great Britain, with the Places Seasons, Time of Day, Depth from the Ground, and Baits suited to their Habits.

	Where generally found.	Season.	Proper time to Angle.	Depth from Ground.	Pastes.	Worms.	Flies.	Fish Insects.
Barbel.	**Rapid and shallow streams, gravelly banks, under bridges, in currents.**	April to August.	From sunrise till 10 M.; 4 P.M. to sunset.	Touch ground.	Old grated cheese, worked up with rusty bacon or butter, coloured with saffron; some say steeped in honey.	Gentles had from putrid flesh, lobworms from gardens, brandlings from dunghills.		
Bleak.	**Deep rivers, sandy bottoms, in eddies and at ships' sterns.**	May to October.	All day.	Six inches; always below mid-water.	White new bread, worked in the hand to a consistency, coloured with vermilion, like salmon's roe, or as above.	Gentles, caddis-worms found under stones, in shallow streams, covered with small pieces of wood or rush, kept moist in flannel bags; brandlings.	Stone-fly, found under hollow stones, sides of streams; green-drake, found among stones, by river sides; black fly, on hawthorns, after budding.	
Bream.	**Slow rivers or mill ponds, near weeds, and in clay or muddy bottoms. Some say rough streams.**	April to December.	Sunrise to 9; 3 to sunset.	Touch ground.	Red paste, as for Bleak; or new brown bread mixed with honey, and worked to a consistency like the red. Some add sheep's blood.	Gentles, flag-worms, found among flags, kept like caddis-worms; lob-worms.	Green-drake, under water.	Grasshoppers in June or July.
Bullhead, or Miller's Thumb.	Rivers & brooks; in stony and gravelly beds.	May to October.	All day.	Near the bottom.	....	Small red worm.		
Carp.	Still, deep ponds or rivers (particularly ponds), muddy bottoms.	April to August.	Very early & very late.	Three inches from bottom, hot weather, in mid-water.	Blood of sheep's heart, mixed with honey and flour, worked up; chewed bread worked stiff with honey or sugar and gumwater.	Earth-bobs, found in sandy ground, kept in mould; gentles, flag-worms, wasp-grubs, found in the nest, hardened over the fire; marsh-worms, found in marshes.		
Chevin, or Chub.	**Still, deep waters, under boughs, gravelly bottoms.**	May to December.	Ditto.	Three inches from bottom; hot weather; in mid-water.	Red and brown pastes, made from white and brown bread, as above.	Earth-bobs, gentles, flag-worms, wasp-grubs, cowdung-hobs, caddis-worms.	Stone-fly, green-drake, oak-fly, found in oaks or ash; ant-fly, found on ant-hills.	Snail, slit, grasshop. beetle.

	Where generally found.	Season.	Proper time to Angle.	Depth from Ground.	Pastes.	Worms.	Flies.	Fish Insects.
Dace, Dase, or Dart.	Sandy bottoms, deep rivers, eddies, and ships' sterns.	May to October.	All day, particularly cloudy weather.	Three to nine inches from bottom or near the top.	Chewed bread worked in the hand till stiff; bread crumbs, worked with honey and sugar, moistened with gum-ivy water.	Earth-bobs, gentles, flag-worms, brandlings.	Stone-fly, green-drake. oak-fly, palmer-fly, found on plants; ant-fly, May-fly, black-fly.	
Eel.	Among weeds, roots, banks, and mills, over holes and stony bottoms.	May to September.	All day when the stream is thickened by rains.	Touch ground.	....	Wasp-grubs, lob-worms.	....	Minnow, gudgeon.
Finnock, or Hirling.	Clear deep stream.	Ditto.	8 to 9, and 3 to 6.	Near the bottom, or in hot weather near the top.	....	....	Any gaudy, artificial flies.	
Grayling, or Umber.	Clear and quick streams, clayey, bottom.	September to January.	All day in cloudy weather.	Three inches from bottom in cold weather; hot, mid water.	....	Earth-bobs, gentles, flag-worms, wasp-grubs, cow-dung hobs, caddis-worms, marsh-worms, brandlings.	All flies.	
Gudgeon.	Gentle Streams, with a gravelly bottom.	May to October.	All day.	Close to the ground.	Red & brown pastes, made from white and brown bread, as above.	Gentles, brandlings.		
Loach, or Groundling.	Rough, clear streams, with a gravelly bottom.	Ditto.	Noon.	Ditto.	....	Brandlings. or any small common worm.		
Minnow, Pink, or Minim.	Shallow rivers and brooks.	All parts of the year.	All day.	All parts of the water.	Brown paste, as above.	Ditto.		
Mullet.	Ebbing tides, and in arms of seas.	March to Michaelmas.	Morning and evening.	Near the bottom or top.		Brandlings, caddis-worms, or earth-bobs.	Small, gaudy-coloured flies.	
Par, Samlet.	Large, deep rivers, towards the middle.	Ditto.	Ditto.	Midwater.	....	Lob-worms.	Ditto.	

	Where generally found.	Season.	Proper time to Angle.	Depth from Ground.	Pastes.	Worms.	Flies.	Fish Insects.
Perch.	Deep rivers and ponds, holes, weeds, gravelly bottoms.	August to May.	Midday, cloudy weather. light south wind	Six inches from bottom, or midwater.	Red and brown pastes, as above.	Red-worms and brandlings, flag and caddis-worms.	....	Minnow, yellow, frog.
Pike.	Clay banks, slow streams, gravelly or weedy bottoms.	May to August, winte. & windy weathr.	All day.	Midwater.	....	....	The largest and most gaudy flies tempt pike in spring.	Ditto. roach, dace.
Pope, or Ruff.	Deep ponds and still rivers, over holes.	May to October.	Ditto.	Six inches from bottom.	....	Brandlings, red-worms, caddis-worms.		
Roach.	Sandy bottom. shady holes, gentle, deep streams.	All parts of the year.	Midday in mild. cloudy weather, hot days, morn and eve.	Below mid-water.	As above for dace.	Earth-bobs, gentles, flag-worms, wasp-grubs, cow-dung, bobs, caddis-worms. &c.	Stone-fly, green-drake, palmer-fly, ant-fly, black-fly.	Grass-hopper.
Rud, or Finscale.	In a few northern lakes of England, and in Oxfordshire.	Ditto.	Morning and evening.	All parts of water.	....	Ditto.	Ditto.	
Salmon.	Large, deep rivers, in the middle.	March to September.	8 to 9 3 to 6	Midwater.	....	Lob-worms, earth-bobs, &c. &c.	All large and gaudy flies.	Minnow, samlet. Bits of shrimps raw.
Smelt, or Spurling.	Docks, and sterns of ships.	April to October.	All day.	Ditto.	....	Earth-bobs, gentles, caddis-worms, &c.	All small flies.	
Stickleback.	Rivers, brooks of all descriptions.	June to October.	Ditto.	....	....	Brandling, or any small worm.		
Tench.	Ponds, rivers, weeds, muddy bottoms.	All the year.	Early and late as possible.	Six in. from bottom. mid. in hot weathr. Cold weather six inches from bot. hot, with fly at top water.	As above for dace.	Earth-bobs, gentles. wasp-grubs, brandlings, caddis-worms.		
Trout.	Rapid, cool streams, clear and pebbly.	March to Michaelmas.	All day.		....	Earth-bobs, &c. &c.	All flies.	Minnow, Grass-hopper, beetle.

⁂ After all the directions that can be given with regard to natural and artificial flies, the Angler will do well to ascertain what flies appear to be most in season, and which are most common in the place where he angles, by beating about the bushes and hedges of the neighbourhood; and with regard to baits in general, great labour may be saved by trying when small fish of the same kind, or of similar habits, preserved in jars, refuse to receive food; as also by cutting fish open when caught, and observing what food is contained in the intestines.

CHAP. I.

THE DIVISION OF SHELL-FISH.

In describing the inhabitants of the water, a class of animals occur, that mankind, from the place of their residence, have been content to call fish; but that naturalists, from their formation, have justly agreed to be unworthy of the name Indeed, the affinity many of this kind bear to the insect tribe, may very well plead for the historian who ranks them rather as insects. However, the common language of a country must not be slightly invaded; the names of things may remain, if the philosopher be careful to give precision to our ideas of them.

There are two classes of animals, therefore, inhabiting the water, which commonly receive the name of fishes, entirely different from those we have been describing, and also very distinct from each other. These are divided by naturalists into Crustaceous and Testaceous animals: both, totally unlike fishes to appearance, seem to invert the order of nature; and as those have their bones on the inside, and their muscles hung upon them for the purposes of life and motion, these, on the contrary, have all their bony parts on the outside, and all their muscles within. Not to talk mysteriously—all who have seen a lobster or an oyster perceive that the shell in these bears a strong analogy to the bones of other animals; and that, by these shells, the animal is sustained and defended.

Crustaceous fish, such as the crab and the lobster, have a shell not quite of a stony hardness, but rather resembling a firm crust, and in some measure capable of yielding. Testaceous fishes, such as the oyster or cockle, are furnished with a shell of a stony hardness; very brittle, and incapable of yielding. Of the crustaceous kinds are the Lobster, the Crab, and the Tortoise: of the testaceous, that numerous tribe of Oysters, Muscles, Cockles, and Sea Snails, which offer with infinite variety.

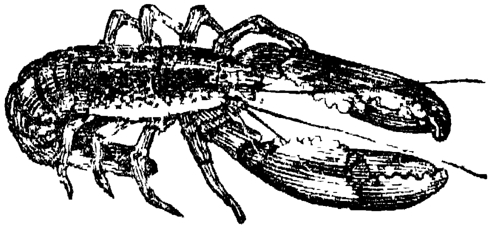
The crustaceous tribe seem to hold the middle rank between fishes, properly so called, and those snail-like animals that receive the name of testaceous fishes.

Their muscles are strong and firm, as in the former; their shell is self produced, as among the latter. They have motion, and hunt for food with great avidity, like the former. They are incapable of swimming, but creep along the bottom, like the latter: in short, they form the link that unites these classes that seem so very opposite in their natures.

Of testaceous fishes we will speak hereafter. As to animals of the crustaceous kind, they are very numerous, their figure offers a hundred varieties; but as to their nature, they are obviously divided into two very distinct kinds, differing in their habits and their conformation. The chief of one kind is the Lobster; the chief of the other, the Tortoise. Under the Lobster we rank the Prawn, the Cray Fish, the Shrimp, the Sea Crab, the Land Crab, and all their varieties. Under the Sea Tortoise, the Turtle, the Hawksbill Turtle, the Land Tortoise, and their numerous varieties.

CHAP. II.

CRUSTACEOUS ANIMALS OF THE LOBSTER KIND.


(The Lobster.)

However different in figure the lobster and the crab may seem, their manners and conformation are nearly the same. With all the voracious appetites of fishes, they are condemned to lead an insect life at the bottom of the water; and though pressed by continual hunger, they are often obliged to wait till accident brings them their prey. Though without any warmth in their bodies, or even without red blood circulating through their veins, they are animals wonderfully voracious. Whatever they seize upon that has life is sure to perish, though never so well defended: they even devour each other; and to increase our surprise still more, they may, in some measure, be said to eat themselves, as they change their shell and their stomach every year, and their old stomach is generally the first morsel that serves to glut the new.

The lobster is an animal of so extraordinary a form, that those who first see it are apt to mistake the head for the tail; but it is soon discovered that the animal moves with its claws foremost; and that the part which plays within itself by joints, like a coat of armour, is the tail. The two great claws are the lobster's instruments of provision and defence: these, by opening like a pair of nippers, have great strength, and take a firm hold; they are usually notched, like a saw, which still more increases their tenacity. Beside these powerful instruments, which may be considered as arms, the lobster has eight legs, four on each side; and these, with the tail, serve to give the animal its progressive and sideling motion. Between the two claws is the animal's head, very small, and furnished with eyes that seem like two black horny specks on each side; and these it has a power of advancing out of the socket, and drawing in at pleasure. The mouth, like that of insects, opens the long way of the body; not cross ways, as with man, and the higher race of animals. It is furnished with two teeth for the comminution of its food; but as these are not sufficient, it has three more in the stomach, one on each side, and the other below. Between the two teeth there is a fleshy substance, in the shape of a tongue. The intestines consist of one long bowel, which reaches from the mouth to the vent; but what this animal differs in from all others, is, that the spinal marrow is in the breast-bone. It is furnished with two long feelers, or horns, that issue on each side of the head, that seem to correct the dimness of its sight, and apprize the animal of its danger, or of its prey. The tail, or that jointed instrument at the other end, is the grand instrument of motion; and with this it can raise itself in the water. Under this we usually see lodged the spawn in great abundance; every pea adhering to the next by a very fine filament, which is scarcely perceivable. Every lobster is a hermaphrodite, and is supposed to be self-impregnated.* The ovary, or place where the spawn is first produced, is backwards, toward the tail, where a red substance is always found, and which is nothing but a cluster of peas that are yet too small for exclusion. From this receptacle there go two canals, that open on each side at the jointures of the shell at the belly; and through these passages the peas descend to be excluded, and placed under the tail, where the animal preserves them from danger for some time, until they come to maturity; when, being furnished with limbs and motion, they drop off into the water.

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* The animals of this tribe are by no means hermaphrodites, but are found distinctly male and female. The eggs are deposited under the tail of the females, which for that purpose is often much broader than that of the males.

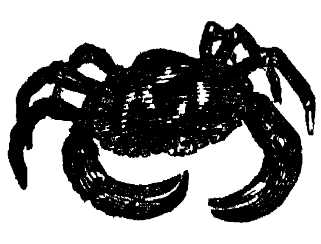
When the young lobsters leave the parent, they immediately seek for refuge in the smallest clefts of rocks, and in such-like crevices at the bottom of the sea, where the entrance is but small, and the opening can be easily defended. There, without seeming to take any food, they grow larger in a few weeks' time, from the mere accidental substances which the water washes to their retreats. By this time, also, they acquire a hard, firm shell, which furnishes them with both offensive and defensive armour. They then begin to issue from their fortresses, and boldly creep along the bottom, in hopes of meeting with more diminutive plunder. The spawn of fish, the smaller animals of their own kind, but chiefly the worms that keep at the bottom of the sea, supply them with plenty. They keep in this manner close among the rocks, busily employed in scratching up the sand with their claws for worms, or surprising such heedless animals as fall within their grasp: thus they have little to apprehend, except from each other; for in them, as among fishes, the large are the most formidable of all other enemies to the small.

But this life of abundance and security is soon to have a most dangerous interruption; for the body of the lobster still continuing to increase, while its shell remains unalterably the same, the animal becomes too large for its habitation, and imprisoned within the crust that has naturally gathered round it, there comes on a necessity of getting free. The young of this kind, therefore, that grow faster, as I am assured by the fishermen, change their shell oftener than the old, who come to their full growth, and who remain in the same shell often for two years together. In general, however, all these animals change their shell once a year; and this is not only a most painful operation, but also subjects them to every danger. Their molting season is generally about the beginning of summer; at which time their food is in plenty, and their strength and vigour in the highest perfection. But soon all their activity ceases: they are seen forsaking the open parts of the deep, and seeking some retired situation among the rocks, or some outlet, where they may remain in safety from the attacks of their various enemies. For some days before their change, the animal discontinues its usual voraciousness: it is no longer seen laboriously harrowing up the sand at the bottom, or fighting with others of its kind, or hunting its prey; it lies torpid and motionless, as if in anxious expectation of the approaching change. Just before casting its shell, it throws itself upon its back, strikes its claws against each other, and every limb seems to tremble; its feelers are agitated, and the whole body is in violent motion: it then swells itself in an unusual manner, and at last the shell is seen beginning to divide at its junctures—particularly it opens at the junctures of the belly where—like a pair of jumps, it was before but seemingly united. It also seems turned inside out; and its stomach comes away with its shell. After this, by the same operation, it disengages itself of the claws, which burst at the joints; the animal, with a tremulous motion, casting them off as a man would kick off a boot that was too big for him.

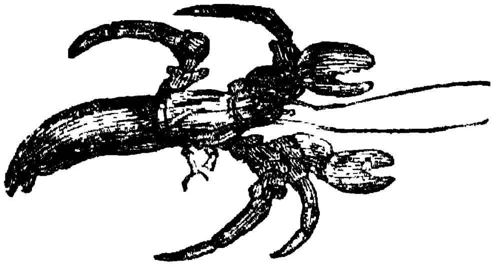
Thus, in a short time, this wonderful creature finds itself at liberty; but in so weak and enfeebled a state, that it continues for several hours motionless. Indeed, so violent and painful is the operation, that many of them die under it; and those which survive, are in such a weakly state for some time that they neither take food, nor venture from their retreats. Immediately after this change, they have not only the softness, but the timidity of a worm. Every animal of the deep is then a powerful enemy, which they can neither escape nor oppose; and this, in fact, is the time when the dog-fish, the cod, and the ray devour them by hundreds. But this state of defenceless imbecility continues for a very short time: the animal, in less than two days, is seen to have the skin that covered its body grown almost as hard as before; its appetite is seen to increase; and, strange to behold! the first object that tempts its gluttony is its own stomach, which it so lately was disengaged from. This it devours with great eagerness; and some time after eats even its former shell. In about forty-eight hours, in proportion to the animal's health and strength, the new shell is perfectly formed, and as hard as that which was but just thrown aside.

Of this extraordinary yet well-known animal there are many varieties, with some differences in the claws, but little in the habits or conformation. It is found above three feet long; and if we may admit the shrimp and the prawn into the class, though unfurnished with claws, it is seen not above an inch. These all live in the water, and can bear its absence for but a few hours. The shell is black when taken out of the water, but turns red by boiling. The most common way of taking the lobster is in a basket, or pot, as the fishermen call it, made of wicker-work, in which they put the bait, and then throw it to the bottom of the sea, in six or ten fathoms' water. The lobsters creep into this for the sake of the bait, but are not able to get out again. The river crawfish differs little from the lobster, but that the one will live only in fresh water, and the other will thrive only in the sea.

The crab is an animal found equally in fresh and salt water; as well upon land as in the ocean. In shape it differs very much from the lobster, but entirely resembles it in habits and conformation. The tail in this animal is not so apparent as in the former, being that broad flap that seems to cover a part of the belly, and when lifted discovers the peas or spawn situated there in great abundance. It resembles the lobster in the number of its claws, which are two, and its legs, which are eight, four on either side. Like the lobster, it is a bold, voracious animal; and such an enmity do crabs bear each other, that those who carry them for sale to market often tie their claws with strings to prevent their fighting and maiming themselves by the way. In short, it resembles the lobster in everything but the amazing bulk of its body compared to the size of its head, and the length of its intestines, which have many convolutions.


(The Crab.)

As the crab, however, is found upon land as well as in the water, the peculiarity of its situation produces a difference in its habitudes which it is proper to describe. The Land Crab is found in some of the warmer regions of Europe, and in great abundance in all the tropical climates in Africa and America. They are of various kinds, and endued with various properties; some being healthful, delicious, and nourishing food—others, poisonous or malignant to the last degree; some are not above half an inch broad, others are found a foot over; some are of a dirty brown, and others beautifully mottled. That animal, called the Violet Crab of the Caribbee Islands, is the most noted, both for its shape, the delicacy of its flesh, and the singularity of its manners.


(The Soldier Crab.)

The violet crab somewhat resembles two hands cut through the middle and joined together; for each side looks like four fingers, and the two nippers or claws resemble the thumbs. All the rest of the body is covered with a shell as large as a man's hand, and bunched in the middle, on the fore part of which there are two long eyes of the size of a grain of barley, as transparent as crystal and as hard as horn. A little below these is the mouth, covered with a sort of barbs, under which there are two broad, sharp teeth, as white as snow. They are not placed, as in other animals, crossways, but in the opposite direction, not much unlike the blades of a pair of scissors. With these teeth they can easily cut leaves, fruits, and rotten wood, which is their usual food. But their principal instrument for cutting and seizing their food is their nippers, which catch such a hold, that the animal loses the limb sooner than its grasp, and is often seen scampering off, having left its claw still holding fast upon the enemy. The faithful claw seems to perform its duty, and keeps for above a minute fastened upon the finger while the crab is making off.(g) In fact, it loses no great matter by leaving a leg or an arm, for they soon grow again, and the animal is found as perfect as before.

This, however, is the least surprising part of this creature's history: and what I am going to relate, were it not as well known and as confidently confirmed as any other circumstance in natural history, it might well stagger our belief. These animals live not only in a kind of orderly society in their retreats in the mountains, but regularly once a year march down to the sea-side in a body of some millions at a time. As they multiply in great numbers, they choose the months of April or May to begin their expedition; and then sally out by thousands from the stumps of hollow trees, from the clefts of rocks, and from the holes which they dig for themselves under the surface of the earth. At that time the whole ground is covered with this band of adventurers; there is no setting down one's foot without treading upon them.(g) The sea is their place of destination, and to that they direct their march with right-lined precision. No geometrician could send them to their destined station by a shorter course; they neither turn to the right nor left, whatever obstacles intervene; and even if they meet with a house, they will attempt to scale the walls to keep the unbroken tenor of their way. But though this be the general order of their route, they, upon other occasions, are compelled to conform to the face of the country; and if it be intersected by rivers, they are then seen to wind along the course of the stream. The procession sets forward from the mountains with the regularity of an army under the guidance of an experienced commander. They are commonly divided into three battalions; of which, the first consists of the strongest and boldest males, that, like pioneers, march forward to clear the route and face the greatest dangers. These are often obliged to halt for want of rain, and go into the most convenient encampment till the weather changes. The main body of the army is composed of females, which never leave the mountains till the rain is set in for some time, and then descend in regular battalia, being formed into columns of fifty paces broad and three miles deep, and so close that they almost cover the ground. Three or four days after this the rear-guard follows; a straggling, undisciplined tribe, consisting of males and females, but neither so robust nor so numerous as the former. The night is their chief time of proceeding; but if it rains by day, they do not fail to profit by the occasion; and they continue to move forward in their slow, uniform manner. When the sun shines and is hot upon the surface of the ground, they then make a universal halt, and wait till the cool of the evening. When they are terrified, they march back in a confused, disorderly manner, holding up their nippers, with which they sometimes tear off a piece of the skin, and then leave the weapon where they inflicted the wound. They even try to intimidate their enemies; for they often clatter their nippers together, as if it were to threaten those that come to disturb them. But though they thus strive to be formidable to man, they are much more so to each other; for they are possessed of one most unsocial property, which is, that if any of them by accident is maimed in such a manner as to be incapable of proceeding, the rest fall upon and devour it on the spot, and then pursue their journey.

This animal, when possessed of its retreats in the mountains, is impregnable; for only subsisting upon vegetables, it seldom ventures out; and its habitation being in the most inaccessible places, it remains for a great part of the season in perfect security. It is only when impelled by the desire of bringing forth its young, and when compelled to descend into the flat country, that it is taken. At that time the natives wait for its descent in eager expectation, and destroy thousands.

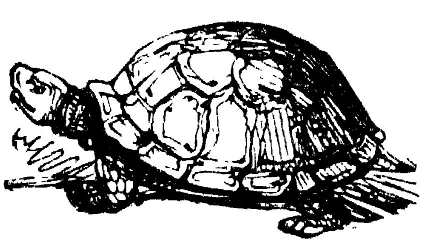
(g) Brown's Jamaica, p. 423.

(g) Labat. Voyage aux Isles Françoises, vol. ii. p. 221.

These crabs are of considerable advantage to the natives; and the slaves very often feed entirely upon them.*

CHAP. III.

THE TORTOISE AND ITS KINDS.



(The Tortoise.)

HAVING described the lobster and the crab as animals in some measure approaching to the insect tribes, it will appear like injustice to place the Tortoise among the number, that, from its strength, its docility, the warm red blood that is circulating in its veins, deserves to be ranked even above the fishes. But as this animal is covered, like the lobster, with a shell, as it is of an amphibious nature, and brings forth its young from the egg without hatching, we must be content to degrade it among animals that in every respect it infinitely surpasses.

Tortoises are usually divided into those that live upon land, and those that subsist in the water; and use has made a distinction even in the name; the one being called Tortoises, the other Turtles. However, Seba has proved that all tortoises are amphibious: that the land tortoise will live in the water, and that the sea turtle can be fed upon land.

All tortoises, in their external form, pretty much resemble each other; their outward covering being composed of two great shells, the one laid upon the other, and only touching at the edges: however, when we come to look closer, we shall find that the upper shell is composed of no less than thirteen pieces, which are laid flat upon the ribs, like the tiles of a house, by which the shell is kept arched and supported. The shells both above and below that, which seem, to an inattentive observer, to make each but one piece, are bound together at the edges by very strong and hard ligaments, yet with some small share of motion. There are two holes at either edge of this vaulted body; one for a very small head, shoulders, and arms, to peep through; the other, at the opposite edge, for the feet and the tail. These shells the animal is never disengaged from; and they serve for its defence against every creature but man.

The tortoise has but a small head, with no teeth; having only two bony ridges in the place, serrated and hard. These serve to gather and grind its food; and such is the amazing strength of the jaws, that it is impossible to open them where they once have fastened. Even when the head is cut off, the jaws st keep their hold; and the muscles, in death, preserve a tenacious rigidity.—Indeed, the animal is possessed of equal strength in all other parts of its body: the legs, though short, are inconceivably strong; and torpid as the tortoise may appear, it has been known to carry five men standing upon its back, with apparent ease and unconcern. Its manner of going forward is by moving its legs one after the other; and the claws, with which the toes are furnished, sink into the ground like the nails of an iron-shod wheel, and thus assist its progression.

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* **LAND CRABS OF JAMAICA.**—Crabs abound in the eastern part of Jamaica at all seasons, but are considered to be best in those months, the names of which contain the letter R. They are not plentiful in May, the season at which they deposit their eggs, or *run*, as the negroes express it, and when the earth is literally covered with them. At this season it is impossible to keep them out of the houses, or even out of the bed-rooms, where, at one time, scratching with their large claws, and, at another, rattling across the floor, they make a noise that would not a little astonish and alarm a stranger. Occasionally they will lodge themselves snugly in a boot, and if a person puts his foot upon them inadvertently, he has quick intimation of the intruder by a grasp of his nipper. For a few weeks in this season, they may be gathered in any quantities; and the negroes sometimes hurt themselves by making too free use of them. Even the hogs catch them, although not always with impunity, as a crab sometimes gets hold of one of them by the snout, from which he is not easily disengaged; and the terrified animal runs about squeaking in great distress.—EDINBURGH NEW PHILOSOPHICAL JOURNAL.

The land tortoise is generally found, as was observed above, from one foot to five feet long, from the end of the snout to the end of the tail; and from five inches to a foot and a half across the back.* It has a small head, somewhat

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* THE LAND TORTOISE.—The Rev. Gilbert White gives the following account of one of these animals in his possession:—

"While I was in Sussex last autumn, my residence was at the village near Lewes, from whence I had formerly the pleasure of writing to you. On the 1st of November, I remarked that the old tortoise, formerly mentioned, began first to dig the ground, in order to the forming of its hybernaculum, which it had fixed on just beside a great turf of hepaticas. It scrapes out the ground with its fore feet, and throws it up over its back with its hind; but the motion of its legs is ridiculously slow, little exceeding the hour hand of a clock, and suitable to the composure of an animal said to be a whole month in performing one feat of copulation. Nothing can be more assiduous than this creature night and day in scooping the earth, and forcing its great body into the cavity; but, as the noons of that season proved unusually warm and sunny, it was continually interrupted, and called forth, by the heat in the middle of the day; and, though I continued there till the 13th of November, yet the work remained unfinished. Harsher weather, and frosty mornings would have quickened its operations.

"No part of its behaviour ever struck me more than the extreme timidity it always expresses with regard to rain; for though it has a shell that would secure it against the wheel of a loaded cart, yet does it discover as much solicitude about rain as a lady dressed in all her best attire, shuffling away on the first sprinklings, and running its head up in a corner. If attended to, it becomes an excellent weather-glass; for as sure as it walks elate, and as it were on tiptoe, feeding with great earnestness in a morning, so sure will it rain before night. It is totally a diurnal animal, and never pretends to stir after it becomes dark. The tortoise, like other reptiles, has an arbitrary stomach, as well as lungs; and can refrain from eating as well as breathing for a great part of the year. When first awakened it eats nothing; nor again in the autumn, before it retires; through the height of the summer, it feeds voraciously, devouring all the food that comes in its way. I was much taken with its sagacity in discerning those that do it kind offices; for, as soon as the good old lady comes in sight who has waited on it for more than thirty years, it hobbles towards its benefactress with awkward alacrity, but remains inattentive to strangers. Thus not only 'the ox knoweth his owner, and the ass his master's crib,' but the most abject reptile and torpid of beings distinguishes the hand that feeds it, and is touched with the feelings of gratitude.

"In about three days after I left Sussex, the tortoise retired into the ground under the hepatica.

"Because we call this creature an abject reptile, we are too apt to undervalue his abilities, and depreciate his powers of instinct. Yet he is, as Mr. Pope says of his lord,

Much too wise to walk into a well;

and has so much discernment as not to fall down a haha, but to stop and withdraw from the brink with the readiest precaution.

"Though he loves warm weather, he avoids the hot sun; because his thick shell, when once heated, would, as the poet says of solid armour, 'scald with safety.' He therefore spends the more sultry hours under the umbrella of a large cabbage leaf, or amidst the waving forests of an asparagus bed.

"But as he avoids the heat in summer, so, in the decline of the year, he improves the faint autumnal beams, by getting within the reflection of a fruit wall; and, though he never has read that planes inclining to the horizon receive a greater share of warmth, he inclines his shell, by tilting it against the wall, to collect and admit every feeble ray.

"Pitiable seems the condition of this poor embarrassed reptile; to be cased in a suit of ponderous armour, which he cannot lay aside —to be imprisoned, as it were, within his own shell, must preclude, we should suppose, all activity and disposition for enterprise. Yet there is a season of the year (usually the beginning of June) when his exertions are remarkable. He then walks on tiptoe, and is stirring by five in the morning; and, traversing the garden, examines every wicket and interstice in the fences, through which resembling that of a serpent; an eye without the upper lid; the under eyelid serving to cover and keep that organ in safety. It has a strong, scaly tail, like the lizard. Its head, the animal can put out and hide at pleasure under the great penthouse of its shell: there it can remain secure from all attacks; there, defended on every side, it can fatigue the patience of the most formidable animal of the forest, that makes use only of natural strength to destroy it. As the tortoise lives wholly upon vegetable food, it never seeks the encounter; yet, if any of the smaller animals attempt to invade its repose, they are sure to suffer. The tortoise, impregnably defended, is furnished with such a strength of jaw, that, though armed only with bony plates instead of teeth, wherever it fastens, it infallibly keeps its hold until it has taken out the piece.

Though peaceable in itself, it is formed for war in another respect, for it seems almost endued with immortality. Nothing can kill it; the depriving it of one of its members is but a slight injury; it will live, though deprived of the brain; it will live, though deprived of its head. Redi informs us that, in making some experiments upon vital motion, he, in the beginning of the month of November, took a land tortoise, made a large opening in its skull and drew out all the brain, washed the cavity, so as not to leave the smallest part remaining, and then, leaving the hole open, set the animal at liberty. Notwithstanding this, the tortoise marched away without seeming to have received the smallest injury; only it shut the eyes and never opened them afterwards. Soon after the hole in the skull was seen to close, and, in three days, there was a complete skin covering the wound. In this manner the animal lived, without a brain, for six months; walking about unconcernedly, and moving its limbs as before. But the Italian philosopher, not satisfied with this experiment, carried it still farther; for he cut off the head, and the animal lived twenty-three days after its separation from the body. The head also continued to rattle the jaws, like a pair of castanets, for above a quarter of an hour.

Nor are these animals less long-lived than difficult in destroying. Tortoises are commonly known to exceed eighty years old: and there was one kept in the Archbishop of Canterbury's garden, at Lambeth, that was remembered above a hundred and twenty. It was at last killed by the severity of a frost, from which it had not sufficiently defended itself in its winter retreat, which was a heap of sand at the bottom of the garden.*

The usual food of the land tortoise seems not so nourishing as to supply this extraordinary principle of vitality. It lives upon vegetables in its retreats in the mountains or the plain; and seldom makes its prey of snails or worms, but when other food is not found in grateful plenty. It is fond also of fruits; and when the forest affords them, is generally found not far from where they grow. As it can move but slowly, it is not very delicate in the choice of its food; so that it usually fills itself with whatever offers. Those that are kept in a domestic state will eat anything; leaves, fruits, corn bran, or grass.

It is common enough to take these animals into gardens, as they are thought to destroy insects and snails in great abundance. We are even told that, in hot countries, they are admitted into a domestic state, as they are great destroyers of bugs. How so large and heavy an animal is capable of being expert at such petty prey, is not easy to conceive: but I have seen several of them about gentlemen's houses, that, in general, appear torpid, harmless, and even fond of employment. Children have sometimes got upon the back of a tortoise; and such was the creature's strength that it never seemed overloaded, but moved off with its burthen to where it expected to be fed, but would carry them no

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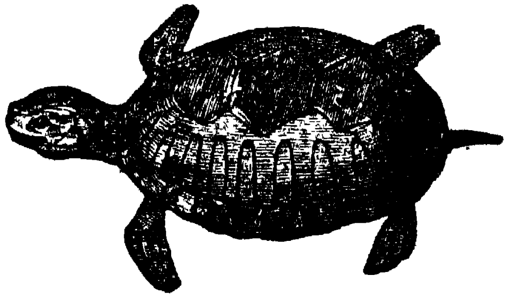
he will escape if possible; and often has eluded the care of the gardener, and wandered to some distant field. The motives that impel him to undertake these rambles seem to be of the amorous kind: his fancy then becomes intent on sexual attachments, which transport him beyond his usual gravity, and induce him to forget for a time his ordinary solemn deportment."—HISTORY OF SELBORNE.

* LONGEVITY OF THE TORTOISE.—A tortoise was placed in the Episcopal palace of Fulham, by Bishop Laud, in 1625, and died in 1753, 128 years; another is mentioned 220 years old, and one lately in Exeter 'Change 800.

further. In winter they regularly find out a place to sleep in; but in those warm countries in which the tortoise is found larger, and in greater plenty than in Europe, they live without retiring the whole year round.



(The Turtle.)

The Sea Tortoise, or Turtle, as it is now called, is generally found larger than the former. This element is possessed with the property of increasing the magnitude of those animals which are common to the land and the ocean. The sea pike is larger than that of fresh water; the sea bear is larger than that of the mountains; and the sea turtle exceeds the land tortoise in the same proportion. It is of different magnitudes, according to its different kinds; some turtles being not above fifty pounds weight, and some above eight hundred.*

The Great Mediterranean Turtle is the largest of the turtle kind with which we are acquainted. It is found from five to eight feet long, and from six to nine hundred pounds weight. But, unluckily, its utility bears no proportion to its size, as it is unfit for food, and sometimes poisons those who eat it. The shell, also, which is a tough, strong integument, resembling a hide, is unfit for all serviceable purposes.

But of all animals of the tortoise kind, the green turtle is the most noted and the most valuable. The delicacy of its flesh, and its nutritive qualities, together with the property of being easily digested, were, for above a century, known only to our seamen and the inhabitants of the coasts where they were taken. It was not till by slow degrees the distinction came to be made between such as were malignant and such as were wholesome. The controversies and contradictions of our old travellers were numerous upon this head; some asserting that the turtle was delicious food; and others that it was actual poison. Dampier, that rough seaman, who has added more to natural history than half of the philosophers that went before him, appears to be the first who informed us of their distinctions; and that, while the rest might be valuable for other purposes, the green turtle alone was chiefly prized for the delicacy of its flesh. He never imagined, however, that this animal would make its way to the luxurious tables of Europe; for he seems chiefly to recommend it as salted up for ship's provision, in case of necessity.

At present the turtle is very well known among us; and is become the favourite food of those that are desirous of eating a great deal without the danger of surfeiting. This is a property the flesh of the turtle seems peculiarly possessed of; and by the importation of it alive among us, gluttony is freed from one of its greatest restraints. The flesh of turtle is become a branch of commerce; and, therefore, ships are provided with conveniences for supplying them with water and provision, to bring them over in health from Jamaica and other West India islands. This, however, is not always effected; for, though they are very vivacious, and scarce require any provision upon the voyage, yet, by the working of the ship, and their beating against the sides of the boat that contains them, they become battered and lean; so that to eat this animal in the highest perfection, instead of bringing the turtle to the epicure, he ought to be transported to the turtle.

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* FRESH WATER TURTLES.—The Tortuga or large fresh-water turtle travels far at times. It deposits its eggs in the sand with surprising address. The land turtles, it is said, are most stupid in this particular, dropping their eggs one by one, as they hobble over the ground, neither covering nor taking any care of them whatever, nor paying any regard to their offspring. The tortuga, on the contrary, covers its eggs so accurately as to leave no signs perceptible of its nest; and, however strange it may seem, she so arranges it as to make her track appear unbroken over the sands, and, after laying her eggs, she proceeds on again in the same direction to complete the deception.

This animal is called the green turtle, from the colour of its shell, which is rather greener than that of others of this kind. It is generally found about two hundred weight; though some are five hundred, and others not above fifty. Dampier tells us of one that was seen at Port-Royal, in Jamaica, that was six feet broad across the back: he does not tell us its other dimensions; but says that the son of Captain Roach, a boy about ten years old, sailed in the shell, as in a boat, from the shore to his father's ship, which was above a quarter of a mile from land. But this is nothing to the size of some turtles the ancients speak of. Ælian assures us that the houses in the island of Taprobane are usually covered with a single shell. Diodorus Siculus tells us that a people, neighbouring on Ethiopia, called the Turtle-eaters, coasted along the shore in boats made of the upper shell of this animal; and that in war, when they had eaten the flesh, the covering served them as a tent. In this account, Pliny and all the rest of the ancients agree; and as they had frequent opportunities of knowing the truth, we are not lightly to contradict their testimony.

At present, however, they are not seen of such amazing dimensions. We are told by Laet, that, on the isle of Cuba, they grow to such a size as that five men can stand on the back of one of them together; and, what is more surprising still, that the animal does not seem overloaded, but will go off with them upon its back, with a slow, steady motion, towards the sea.

They are found in the greatest numbers on the island of Ascension; where, for several years, they are taken to be salted to feed the slaves, or for a supply of ship's provision. Their value at present seems to be better known.

This animal seldom comes from the sea but to deposit its eggs, and now and then to sport in fresh water. Its chief food is a submarine plant that covers the bottom of several parts of the sea not far from the shore. There the turtles are seen, when the weather is fair, feeding in great numbers, like flocks of sheep, several fathoms' deep upon the verdant carpet below. At other times they go to the mouths of rivers, and they seem to find gratification in fresh water. After some time thus employed, they seek their former stations; and when done feeding, they generally float with their heads above water, unless they are alarmed by the approach of hunters or birds of prey, in which case they suddenly plunge to the bottom. They often seek their provision among the rocks, feeding upon moss and sea-weed; and, it is probable, will not disdain to prey upon insects and other small animals, as they are very fond of flesh when taken and fed for the table.

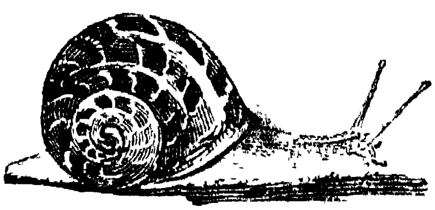
At the time of breeding, they are seen to forsake their former haunts and their food, and to take sometimes a voyage of nine hundred miles to deposit their eggs on some favourite shore. The coasts they always resort to upon these occasions are those that are low, flat, and sandy; for being heavy animals, they cannot climb a bold shore: nor is any bed so proper as sand to lay their eggs on. They couple in March, and continue united till May; during a great part of which time they are seen locked together, and almost incapable of separation. The female seems passive and reluctant; but the male grasps her with his claws in such a manner that nothing can induce him to quit his hold. It would seem that the grasp, as in frogs, is in some measure convulsive, and that the animal is unable to relax its efforts.

At present, from the great appetite that man has discovered for this animal, they are not only thinned in their numbers, but are also grown very shy. There are several other ways, therefore, contrived for taking them. One is, to seize them when coupled together, at the breeding season, when they are very easily approached, and as easily seen: for these animals, though capable of living for some time under water, yet rise every eight or ten minutes to breathe. As soon as they are thus perceived, two or three people draw near them in a canoe, and slip a noose either round their necks or one of their feet. If they have no line, they lay hold of them by the neck, where they have no shell, with their hands only; and by this means they usually catch them both together. But sometimes the female escapes, being more shy than the male.

Another way of taking them is by the harpoon, either when they are playing on the surface of the water, or feeding on the bottom: when the harpoon is skilfully darted, it sticks fast in the shell of the back; the wood then disengages from the iron, and the line is long enough for the animal to take its range; for if the harpooner should attempt at once to draw the animal into his boat till it is weakened by its own struggling, it would probably get free. Thus the turtle struggles hard to get loose, but all in vain; for they take care the line fastened to the harpoon shall be strong enough to hold it.

CHAP. I.

THE SHELL OF TESTACEOUS FISHES.


(The Snail.)

One is apt to combine very dissimilar objects in the same group, when hurried into the vortex of method. No two animals are more unlike each other than the whale and the limpet, the tortoise and the oyster. Yet, as these animals must find some place in the picture of animated nature, it is best to let them rest in the station where the generality of mankind have assigned them; and as they have been willing to give them all, from their abode, the name of fishes, it is wisest in us to conform.

But before I enter into any history of shell-fish, it may not be improper to observe, that naturalists who have treated on this part of history, have entirely attended to outward forms; and, as in many other instances, forsaking the description of the animal itself, have exhausted all their industry in describing the habitation. In consequence of this radical error, we have volumes written upon the subject of shells, and very little said on the history of shell-fish.

As I have only undertaken to write the history of animated nature, the variety of shells, and their peculiar spots or blemishes, do not come within my design.

With respect to the figure of shells, Aristotle has divided them into three kinds; and his method is, of all others, the most conformable to nature. These are, first, the Univalve, or Turbinated, which consist of one piece, like the box of a snail; secondly, the Bivalve, consisting of two pieces, united by a hinge, like an oyster; and thirdly, the Multivalve, consisting of more than two pieces, as the acorn-shell, which has not less than twelve pieces that go to its composition. All these kinds are found in the sea at different depths; and are valuable in proportion to their scarceness or beauty.

From the variety of the colours and figure of shells, we may pass to that of their place and situation. Some are found in the sea; some in fresh water rivers; some alive upon land; and a still greater quantity dead in the bowels of the earth. But wherever shells are found, they are universally known to be composed of one and the same substance. They are formed of an animal or calcareous earth, that ferments with vinegar and other acids, and that burns into lime, and will not easily melt into glass. Such is the substance of which they are composed; and of their spoils, many philosophers think that a great part of the surface of the earth is composed at present. It is supposed by them, that chalks, marles, and all such earths as ferment with vinegar, are nothing more than a composition of shells, decayed, and crumbled down to one uniform mass.

Sea-shells are either found in the depths of the ocean, or they are cast empty and forsaken of their animals upon shore. Those which are fished up from the deep, are called by the Latin name Pelagii; those that are cast upon shore, are called Littorales. Many of the pelagii are never seen upon shore; they continue in the depths where they are bred; and we owe their capture only to accident. These, therefore, are the most scarce shells; and consequently, the most valuable. The littorales are more frequent; and such as are of the same kind with the pelagii are not so beautiful. As they are often empty and forsaken, and as their animal is dead and perhaps putrid in the bottom of the shell, they by this means lose the whiteness and the brilliancy of their colouring. They are not unfrequently also found eaten through, either by worms, or by each other; and they are thus rendered less valuable: but what decreases their price still more is, when they are scaled and worn by lying too long empty at the bottom, or exposed upon the shore. Upon the whole, however, sea shells exceed either land or fossil shells in beauty; they receive the highest polish, and exhibit the most brilliant and various colouring.

Fresh-water shells are neither so numerous, so various, nor so beautiful as those belonging to the sea. They want that solidity which the others have: their clavicle, as it is called, is neither so prominent nor so strong; and not having a saline substance to tinge the surface of the shell, the colours are obscure. In fresh-water there are but two kinds of shells; namely, the bivalved and the turbinated.

Living land shells are more beautiful, though not so various as those of fresh-water; and some not inferior to sea-shells in beauty. They are indeed but of one kind, namely, the turbinated; but in that there are found four or five very beautiful varieties.

Of fossil, or, as they are called, *extraneous* shells, found in the bowels of the earth, there are great numbers, and as great a variety. In this class there are as many kinds as in the sea itself. There are found the turbinated, the bivalve, and the multivalve kinds; and of all these, many at present are not to be found even in the ocean. Indeed, the number is so great, and the varieties so many, that it was long the opinion of naturalists, that they were merely the capricious productions of Nature, and had never given retreat to animals whose habitations they resembled. They were found, not only of various kinds, but in different states of preservation: some had the shell entire, composed, as in its primitive state, of a white calcareous earth, and filled with earth or even empty; others were found with the shell entire, but filled with a substance which was petrified by time; others, and these in great numbers, were found with the shell entirely mouldered away, but the petrified substance that filled it still exhibiting the figure of the shell; others still, that had been lodged near earth or stone, impressed their print upon these substances, and left the impression, though they themselves were decayed: lastly, some shells were found half mouldered away, their parts scaling off from each other in the same order in which they were originally formed. However, these different stages of the shell, and even their fermenting with acids, were at first insufficient to convince those who had before assigned them a different origin. They were still considered as accidentally and sportively formed, and deposited in the various repositories where they were found, but no way appertaining to any part of animated nature. This put succeeding inquirers upon more minute researches; and they soon began to find, that often where they dug up petrified shells or teeth, they could discover the petrified remains of some other bony parts of the body. They found that the shells which were taken from the earth, exhibited the usual defects and mischances, which the same kind are known to receive at sea. They showed them not only tinctured with a salt-water crust, but pierced in a peculiar manner by the sea-worms, that make the shells of fishes their favourite food. These demonstrations were sufficient at last to convince all but a few philosophers who died away, and whose erroneous systems died with them.

Every shell, therefore, wherever it is found, is now considered as the spoil of some animal, that once found shelter therein. It matters not by what unaccountable means they may have wandered from the sea; but they exhibit all and the most certain marks of their origin. From their numbers and situation, we are led to conjecture, that the sea reached the places where they are found; and from their varieties we learn how little we know of all the sea contains at present; as the earth furnishes many kinds which our most exact and industrious shell-collectors have not been able to fish up from the deep. It is most probable, that thousands of different forms still remain at the bottom unknown; so that we may justly say with the philosopher: *En quæ scimus sunt pars minima eorum quæ ignoramus.*

It is well, however, for mankind, that the defect of our knowledge on this subject is, of all parts of learning, that which may be most easily dispensed with. An increase in the number of shells, would throw but very few lights upon the history of the animals that inhabit them. For such information we are obliged to those men who contemplated something more than the outside of the objects before them. To Reaumur we are obliged for examining the manners of some with accuracy; but to Swammerdam for more. In fact, this Dutchman has lent an attention to those animals, that almost exceeds credibility: he has excelled even the insects he dissected, in patience, industry, and perseverance. It was in vain that this poor man's father dissuaded him from what the world considered as a barren pursuit; it was in vain that an habitual disorder, brought on by his application, interrupted his efforts; it was in vain that mankind treated him with ridicule while living, as they suffered his works to remain long unprinted and neglected when dead: still the Dutch philosopher went on, peeping into unwholesome ditches, wading through fens, dissecting spiders, and enumerating the blood-vessels of a snail: like the bee, whose heart he could not only distinguish, but dissect; he seemed instinctively impelled by his ruling passion, although he found nothing but ingratitude from man, and though his industry was apparently becoming fatal to himself. From him I will take some of the leading features in the history of those animals which breed in shells; previously taking my division from Aristotle, who, as was said above, divides them into three classes: the Turbinated, or those of the Snail Kind; the Bivalved, or those of the Oyster Kind; and the Multivalved, or those of the Acorn-shell Kind. Of each I will treat in distinct chapters.

CHAP. II.

TURBINATED SHELL-FISH OF THE SNAIL KIND.

To conceive the manner in which those animals subsist that are hid from us at the bottom of the deep, we must again have recourse to one of a similar nature and formation that we know. The history of the garden-snail has been more copiously considered than that of the elephant, and its anatomy is as well, if not better, known.

What is most surprising in the formation of this animal are the parts that serve for generation. Every snail is at once male and female; and while it impregnates another, is itself impregnated in turn. The vessels, supplying the fluid for this purpose, are placed chiefly in the fore part of the neck, and extend themselves over the body; but the male and female organs of generation are always found united, and growing together. There is a large opening on the right side of the neck which serves for very different purposes. As an anus it gives a passage to the excrements; as a mouth it serves for an opening for respiration; and, also, as an organ of generation, it dilates when the desire of propagation begins. Within this each animal has those parts, or something similar thereto, which continue the kind.

For some days before coition, the snails gather together, and lie quiet near each other, eating very little in the mean time; but they settle their bodies in such a posture, that the neck and head are placed upright. In the mean time, the apertures on the side of the neck being greatly dilated, two organs, resembling intestines, are seen issuing from them, which some have thought to be the instruments of generation. Beside the protrusion of these, each animal is possessed of another peculiarity; for, from the same aperture, they launch forth a kind of dart at each other, which is pretty hard, barbed, and ending in a very sharp point. This is performed when the apertures approach each other; and then the one is seen to shoot its weapon, which is received by the other, though it sometimes falls to the ground: some minutes after, the snail which received the weapon, darts one of its own at its antagonist, which is received in like manner. They then softly approach still nearer, and apply their bodies one to the other, as closely as the palms and fingers of the hands when grasped together. At that time the horns are seen variously moving in all directions; and this sometimes for three days together. The coupling of these animals is generally thrice repeated, at intervals of fifteen days each, and, at every time, a new dart is mutually emitted.

At the expiration of eighteen days, the snails produce their eggs at the opening of the neck, and hide them in the earth with the greatest solicitude and industry. These eggs are in great numbers, round, white, and covered with a soft shell: they are also stuck to each other by an imperceptible slime, like a bunch of grapes, of about the size of a small pea.

When the animal leaves the egg, it is seen with a very small shell on its back, which has but one convolution; but in proportion as it grows, the shell increases in the number of its circles. The shell always receives its additions at the mouth; the first centre still remaining, the animal sending forth from its body that slime which hardens into a stony substance, and still is fashioned into similar volutions. The garden snail seldom exceeds four rounds and a half; but some of the sea snails arrive even at ten.

The snail, thus fitted with its box, which is light and firm, finds itself defended in a very ample manner from all external injury. Whenever it is invaded, it is but retiring into this fortress, and waiting patiently till the danger is over. Nor is it possessed only of a power of retreating into its shell, but of mending it when broken. Sometimes these animals are crushed seemingly to pieces, and, to all appearance, utterly destroyed; yet still they set themselves to work, and, in a few days, mend all their numerous breaches.

As the snail is furnished with all the organs of life and sensation, it is not wonderful to see it very voracious. It chiefly subsists upon the leaves of plants and trees; but is very delicate in its choice. When the animal moves to seek its food, it goes forward by means of that broad, muscular skin, which sometimes is seen projecting round the mouth of the shell; this is expanded before, and then contracted with a kind of undulating motion, like a man attempting to move himself forward by one arm while lying on his belly. But the snail has another advantage, by which it not only smooths and planes its way, but also can ascend in the most perpendicular direction. This is by that slimy substance with which it is so copiously furnished, and which it emits wherever it moves. Upon this slime, as upon a kind of carpet, it proceeds slowly along, without any danger of wounding its tender body against the asperities of the pavement; by means of this it moves upwards to its food upon trees, and by this descends, without danger of falling, and breaking its shell by the shock.

The appetite of these animals is very great; and the damage gardeners, in particular, sustain from them, makes them employ every method for their destruction. Salt will destroy them as well as soot; but a tortoise in a garden is said to banish them much more effectually.

At the approach of winter, the snail buries itself in the earth, or retires some hole, to continue in a torpid state during the severity of the season. It is sometimes seen alone; but more frequently in company in its retreat; several being usually found together apparently deprived of life and sensation. For the purposes of continuing in greater warmth and security, the snail forms a cover or lid to the mouth of its shell with its slime, which stops it up entirely, and thus protects it from every external danger. The matter of which the cover is composed is whitish, somewhat like plaster, pretty hard and solid, yet, at the same time, porous and thin, to admit air, which the animal cannot live without. When the cover is formed too thick, the snail then breaks a little hole in it, which corrects the defect of that closeness which proceeded from too much caution. In this manner, sheltered in its hole from the weather, defended in its shell by a cover, it sleeps during the winter; and, for six or seven months, continues without food or motion, until the genial call of spring breaks its slumber and excites its activity.*

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* On the Revivification of Animals.—It has been mentioned as a fact long known to the inhabitants of India, that in that country, when the wet season commences, the rain falls so abundantly as to form ponds of considerable depth in hollow places, where, for several months previous, not any moisture could be observed; not even so much as to give nourishment to any kind of plant whatever. No sooner, however, does the rain begin to fall, than in the fields, which were in general utterly destitute of the most remote appearance of vegetation, vegetation commences; and in less than twenty-four hours, verdure can be distinctly perceived. But the most wonderful circumstance that is represented to occur on this occasion is, that almost as soon as verdure is perceptible, the new-formed ponds abound with fishes, which are not only fit for food, but are esteemed a great delicacy. The precise time that occurs between the commencement of the rainy season and the taking of the fish, is not mentioned; but it is stated, that they have been eaten within forty-eight hours of the former period.

It has been suggested that the ponds have communication with rivers; but to this it is answered, that fishes are, in like manner, found even in islands where, during the dry season, there is not any running water.

As in some measure analogous to this circumstance, we shall detail another, which may, perhaps, be deemed still more extraordinary:—

In forming a collection of shells, great diligence had been employed to obtain a variety of the snails of this country, which, after being cleaned and dried, were placed in a cabinet. In this state they remained for many years, during which time they were occasionally inspected, and not any idea was entertained but that life was utterly extinct. One day, however, the snails were found dispersed throughout the cabinet, crawling in a state of perfect life and complete activity; and it was discovered, upon examination, that water had obtained access, so as to moisten the snails, by which means they were restored to life after they had, in consequence of the dissection of all their members, been wholly deprived of action for many years, without, however, the principle of life being entirely destroyed.

Contradictory to the common operations of nature as these instances may appear, they are not on that account to be rejected as unentitled to credit, since it is known to those who are intimately acquainted with minute objects of animated nature, that some of these can be preserved in a dry state for an indefinite length of time, liable to be revived at pleasure by being moistened with water; it must, however, be confessed that till the occurence of the phenomenon here mentioned, it had never been suspected that any animal body, of a magnitude in any respect approaching to the size of a snail, could admit of having its life prolonged after this manner.

The winter sleep of bats and several other animals is a fact well known; this, though not a privation of life, is yet a suspension of the principal animal functions for many months together, and seems to be occasioned by the influence of a certain degree of cold, which retards, if it does not put a stop to, the circulation, during the continuance of its influence. While, however, the germ of life exists, putrefaction is prevented from taking place; and the parts of the body, being unaltered during this period, are in a condition to perform their functions once more after the fluids are set in motion. In the instance of the snails, it would seem that the want of moisture produced, in the suspension of the animal functions, an effect similar to that which cold occasions with regard to the sleeping animals, but in a far more powerful degree.

To a similar cause we might be induced to attribute the presence of the fishes already alluded to, were we not told, that the hollows in which the ponds are formed do not possess

The snail, having slept for so long a season, wakes one of the first fine days of April; breaks open its cell, and sallies forth to seek for nourishment. It is not surprising that so long a fast should have thinned it, and rendered it very voracious. At first, therefore, it is not very difficult in the choice of its food: almost any vegetable that is green seems welcome; but the succulent plants of the garden are chiefly grateful; and the various kinds of pulse are, at some seasons, almost wholly destroyed by their numbers. So great is the multiplication of snails, at some years, that gardeners imagine they burst from the earth. A wet season is generally favourable to their production; for this animal cannot bear very dry seasons, or dry places, as they cause too great a consumption of its slime, without plenty of which it cannot subsist in health and vigour. Such are the most striking particulars in the history of this animal; and this may serve as a general picture, to which the manners and habitudes of the other tribes of this class may be compared and referred. These are, the sea snail, of which naturalists have, from the apparent difference of their shells, mentioned fifteen kinds;(*g*) the fresh-water snail, of which there are eight kinds; and the land snail, of which there are five. These all bear a strong resemblance to the garden snail, in the formation of their shell, in their hermaphrodite natures, in the slimy substance with which they are covered, in the formation of their intestines, and the disposition of the hole on the right side of the neck, which serves at once for the discharge of the fæces, for the lodging the instruments of generation, and for respiration, when the animal is under a necessity of taking in a new supply.

But in nature no two kinds of animals, however like each other in figure or conformation, are of manners entirely the same. Though the common garden snail bears a very strong resemblance to that of fresh water and that of the sea, yet there are differences to be found, and those very considerable ones.

If we compare them with the fresh-water snail, though we shall find a general resemblance, yet there are one or two remarkable distinctions: and first, the fresh-water snail, and, as I should suppose, all snails that live in water, are peculiarly furnished with a contrivance by Nature for rising to the surface or sinking to the bottom. The manner in which this is performed, is by opening and shutting the orifice on the right side of the neck, which is furnished with muscles for that purpose. The snail sometimes gathers this aperture into an oblong tube, and stretches or protends it above the surface of the water, in order to draw in or expel the air, as it finds occasion. This may not only be seen, but heard, also, by the noise which the snail makes in moving the water. By dilating this it rises; by compressing it, the animal sinks to the bottom. This is effected somewhat in the manner in which little images of glass are made to rise or sink in water, by pressing the air contained at the mouth of the tubes, so that it shall drive the water into their hollow bodies, which before were filled only with air, and thus make them heavier than the element in which they swim. In this manner does the fresh-water snail dive or swim, by properly managing the air contained in its body.

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during the dry season, any appearances upon which the revivifying principle could be supposed so to act as to produce them; nor can they be considered as produced from spawn deposited during the previous wet season, as they are represented to be at their first coming of such a size as to admit of being caught with nets.

That such multitudes of living creatures, arrived at such a size in so short a period of time, should be found under such peculiar circumstances, remains, therefore, a mystery which cannot readily be solved, but which has been attempted to be explained, by supposing that on the approach of dry weather, these fishes have buried themselves deep in the mud, into which they would naturally dive as low as possible in search of moisture, till at last, when that entirely failed them, they were there dried up like the snails, and their animal functions suspended, without being deprived of life, until the return of moisture revived them, when they instantly returned to their natural element in that state of growth to which they had attained before the period of their desiccation.—CORRESPONDENT OF THE MIRROR.

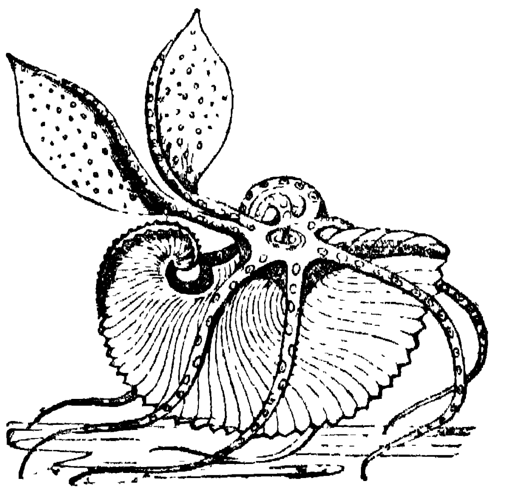
(*g*) D'Argenville's Conchylicligie.

But what renders these animals far more worthy of notice is, that they are viviparous, and bring forth their young not only alive, but with their shells upon their backs. This seems surprising; yet it is incontestably true: the young come to some degree of perfection in the womb of the parent; there they receive their stony coat; and from thence are excluded, with a complete apparatus for subsistence.

"On the twelfth of March," says Swammerdam, "I began my observations upon this snail, and collected a great number of the kind, which I put into a large basin filled with rain-water, and fed for a long time with potter's earth, dissolved in the water about them. On the thirteenth of the same month I opened one of these snails, when I found nine living snails in its womb: the largest of these were placed foremost, as the first candidates for exclusion. I put them into fresh-water, and they lived to the eighteenth of the same month, moving and swimming like snails full grown: nay, their manner of swimming was much more beautiful." Thus, at whatever time of the year these snails are opened, they are found pregnant with eggs, or with living snails; or with both together.

This striking difference between the fresh-water and the garden snail, obtains also in some of the sea kind; among which there are some that are found viviparous, while others lay eggs in the usual manner. Of this kind are one or two of the Buccinums; within which, living young have been frequently found, upon their dissection. In general, however, the rest of this numerous class bring forth eggs; from whence the animal bursts at a proper state of maturity, completely equipped with a house, which the moistness of the element where it resides does not prevent the inhabitant from enlarging. How the soft slime of the snail hardens, at the bottom of the sea, into the stony substance of a shell, is not easy to conceive! This slime must at least be possessed of very powerful petrifying powers.

Of all sea snails, that which is most frequently seen swimming upon the surface, and whose shell is the thinnest and most easily pierced, is the Nautilus. Whether, upon these occasions, it is employed in escaping its numerous enemies at the bottom, or seeking for food at the surface, I will not venture to decide. It seems most probable, that the former is the cause of its frequently appearing; for, upon opening the stomach, it is found to contain chiefly that food which it finds at the bottom. This animal's industry, therefore, may be owing to its fears; and all those arts of sailing, which it has taught mankind, may have been originally the product of necessity. But the nautilus is too famous not to demand a more ample description.


(The Nautilus.)

Although there be several species of the nautilus, yet they all may be divided into two: the one with a white shell, as thin as paper, which it often is seen to quit, and again to resume; the other with a thicker shell, sometimes of a beautiful mother-of-pearl colour, and that quits its shell but rarely. This shell outwardly resembles that of a large snail, but is generally six or eight inches across: within, it is divided into forty partitions, that communicate with each other by doors, if I may so call them, through which one could not thrust a goose-quill: almost the whole internal part of the shell is filled by the animal; the body of which, like its habitation, is divided into as many parts as there are chambers in its shell: all the parts of its body communicate with each other, through the doors or openings, by a long blood-vessel, which runs from the head to the tail: thus the body of the animal, if taken out of the shell, may be likened to a num ber of soft bits of flesh, of which there are forty, threaded upon a string. From this extraordinary conformation, one would not be apt to suppose that the nautilus sometimes quitted its shell, and returned to it again; yet nothing, though seemingly more impossible, is more certain. The manner by which it contrives to disengage every part of its body from so intricate an habitation; by which it makes a substance, to appearance as thick as one's wrist, pass through forty doors, each of which would scarcely admit a goose quill, is not yet discovered: but the fact is certain; for the animal is often found without its shell; and the shell more frequently destitute of the animal. It is most probable, that it has a power of making the substance of one section of its body remove up into that which is next; and thus, by multiplied removals, it gets free.

But this, though very strange, is not the peculiarity for which the nautilus has been the most distinguished. Its spreading the thin oar, and catching the flying gale, to use the poet's description of it, has chiefly excited human curiosity.* These animals, particularly those of the white, light kind, are chiefly found in the Mediterranean; and scarce any who have sailed on that sea, but must often have seen them. When the sea is calm, they are observed floating on the surface; some spreading their little sail; some rowing with their feet, as if for life and death; and others still, floating upon their mouths, like a ship with the keel upward. If taken while thus employed, and examined, the extraordinary mechanism of their limbs for sailing will appear more manifest. The nautilus is furnished with eight feet, which issue near the mouth, and may as properly be called barbs: these are connected to each other by a thin skin, like that between the toes of a duck, but much thinner and more transparent. Of these eight feet thus connected, six are short, and these are held up as sails to catch the wind in sailing: the two others are longer, and are kept in the water; serving, like paddles, to steer their course by. When the weather is quite calm, and the animal is pursued from below, it is then seen expanding only a part of its sail, and rowing with the rest: whenever it is interrupted, or fears danger from above, it instantly furls the sail, catches in all its oars, turns its shell mouth downward, and instantly sinks to the bottom. Sometimes also it is seen pumping the water from its leaking hulk; and, when unfit for sailing deserts its shell entirely. The forsaken hulk is seen floating along, till it dashes, by a kind of shipwreck, upon the rocks or the shore.

From the above description, I think we may consider this animal rather as attempting to save itself from the attacks of its destroyers, than as rowing in pursuit of food. Certain it is, that no creature of the deep has more numerous and more powerful enemies. Its shell is scarcely ever found in perfect preservation; but is generally seen to bear some marks of hostile invasion. Its little arts, therefore, upon the surface of the water, may have been given it for protection; and it may be thus endued with comparative swiftness, to avoid the crab, the sea-scorpion, the trochus, and all the slower predacious reptiles that lurk for it at the bottom of the water.

From this general view of snails, they appear to be a much more active, animated tribe, than from their figure one would at first conceive. They seem, to an inattentive spectator, as mere inert masses of soft flesh, rather loaded than covered with a shell, scarcely capable of motion, and insensible to all the objects around them. When viewed more closely, they are found to be furnished with the organs of life and sensation in tolerable perfection: they are defended with armour, that is at once both light and strong; they are as active as their necessities require; and are possessed of appetites more poignant than those of animals that seem much more perfectly formed. In short, they are a fruitful industrious tribe; furnished, like all other animals, with the powers of escape and invasion; they have their pursuits and their enmities; and, of all creatures of the deep, they have most to fear from each other.

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* The words of the poet alluded to by Goldsmith, are,—

"Thus, then, to man the voice of Nature spake,—
Go, from the creatures thy instruction take:
Learn from the birds what food the thickets yield:
Learn from the beasts the physic of the field:
The arts of building from the bee receive,
Learn of the mole to plough, the worm to weave;
Learn of the little Nautilus to sail,
Spread the thin oar, and catch the driving gale."

POPE.

CHAP. III.

BIVALVED SHELL-FISH, OR SHELLS OF THE OYSTER KIND.

It may seem whimsical to make a distinction between the animal perfections of turbinated and bivalved shell-fish, or to grant a degree of superiority to the snail above the oyster. Yet this distinction strongly and apparently obtains in nature; and we shall find the bivalved tribe of animals in every respect inferior to those we have been describing. Inferior in all their sensations; inferior in their powers of motion; but particularly inferior in their system of animal generation. The snail tribe, as we saw, are hermaphrodite, but require the assistance of each other for fecundation; all the bivalve tribe are hermaphrodite in like manner, but they require no assistance from each other towards impregnation; and a single muscle or oyster, if there were no other in the world, would quickly replenish the ocean. As the land snail from its being best known took the lead in the former class, so the fresh-water muscle, for the same reason, may take lead in this. The life and manners of such as belong to the sea will be best displayed in the comparison.

The muscle, as is well known, whether belonging to fresh or salt-water, consists of two equal shells, joined at the back by a strong muscular ligament that answers all the purposes of a hinge.* By the elastic contraction of these, the

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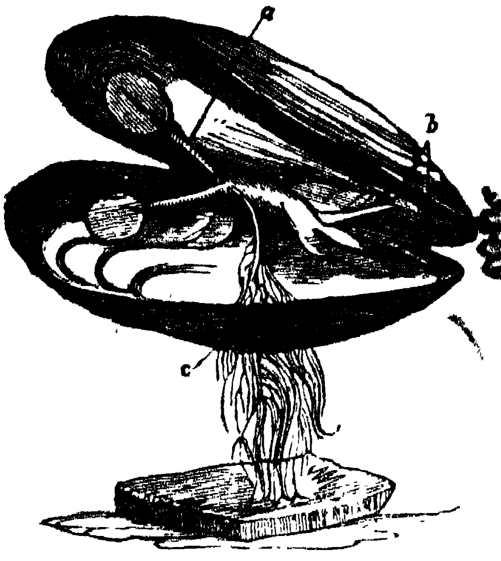
* The Muscle.—The muscles, the Pinnæ, some pectens and Arcæ, are moored by what is vulgarly called the beard of the fish, but in the language of science the byssus. This consists of a bundle of blackish horny fibres or threads, connected to the animal within the shell on the one hand, and to the rock on the other. These threads are formed, according to Cuvier and most authors, of a glutinous matter, secreted by a conglomerate gland placed at the base of the foot, and drawn out by the evolutions of this organ to their proper length, and moulded to their shape in a longitudinal groove on its surface. Blainville, however, considers this an erroneous account; for, according to him, the byssus is a collection of dried muscular fibres. The adductor muscle, he says, of these genera is at first, like those of other Mollusca, contractile and living; but being protruded beyond the shell, and attached to the rock, it becomes dried and inirritable to a certain extent, and the fibres by their exsiccation become loose from the thready cable, such as we observe it. I know not which of these explanations to commend to your choice, for neither of them exactly corresponds with the observations I have made to satisfy myself; but my examination having been confined to the common muscle (Mytilus edulis,) I will not aver that the following description of this part is generally applicable. From each side of the shell, in front of the great adductors, a cylindrical tendinous muscle arises, *see the Cut,* (*a*) and running forward obliquely, it meets its fellow near the centre, and opposite to the hinge, where they unite, and where they are met by other two similar, muscles (*b*) which arise near the beaks, anterior to the lesser adductors, and run backward. From the place of union between these muscles originates the byssus (*c*) by a single root or stalk. This is firm, cylindrical, cartilaginous, and of a clear amber colour, continuing simple for a short space, when it divides, in a very irregular manner, into a few branches which are again divided into numerous entangled



(The Muscle.)

animal can open its shells at pleasure, about a quarter of an inch from each other. The fish is fixed to either shell by four tendons, by means of which it shuts them close, and keeps its body firm from being crushed by any shock against the walls of its own habitation. It is furnished, like all other animals of this kind, with vital organs, though these are situated in a very extraordinary manner. It has a mouth furnished with two fleshy lips; its intestine begins at the bottom of the mouth, passes through the brain, and makes a number of circumvolutions through the liver; on leaving this organ, it goes on straight into the heart, which it penetrates, and ends in the anus; near which the lungs are placed, and through which it breathes, like those of the snail kind; and in this manner its languid circulation is carried on. (g)

But the organs of generation are what most deserve to excite our curiosity. These consist in each muscle of two ovaries, which are the female part of its furniture, and of two seminal vessels resembling what are found in the male. Each ovary and each seminal vessel has its own proper canal; by the ovary canal the eggs descend to the anus; and there also the seminal canals send their fluids to impregnate them. By this contrivance, one single animal suffices for the double purposes of generation; and the eggs are excluded and impregnated by itself alone.

As the muscle is thus furnished with a kind of self creating power, there are few places where it breeds that it is not found in great abundance. The ovaries usually empty themselves of their eggs in spring, and they are replenished in autumn. For this reason they are found empty in summer and full in winter. They produce in great numbers, as all bivalved shell fish are found to do. The fecundity of the snail kind is trifling in comparison to the fertility of these. Indeed, it may be asserted as a general rule in nature, that the more helpless and contemptible the animal, the more prolific it is always found. Thus all creatures that are incapable of resisting their destroyers have nothing but their quick multiplication for the continuation of their existence.

The multitude of these animals in some places is very great; but from their defenceless state, the number of their destroyers is in equal proportion.

But, notwithstanding the number of this creature's animated enemies, it seems still more fearful of the agitations of the element in which it resides; for if dashed against rocks, or thrown far on the beach, it is destroyed without a power of redress. In order to guard against these, which are to this animal the commonest and the most fatal accidents, although it has a power of slow motion, which I shall presently describe, yet it endeavours to become stationary, and to attach itself to any fixed object it happens to be near. For this purpose, it is furnished with a very singular capacity of binding itself by a number of threads to whatever object it approaches; and these, Reaumur supposed, it spun artificially, as spiders their webs which they fasten against a wall. Of this, however, later philosophers have found very great reason to doubt. It is, therefore, supposed that these threads, which are usually called the beard of the muscle, are the natural growth of the animal's body, and by no means produced at pleasure. Indeed, the extreme length of this beard in some, which far exceeds the length of the body, seems impossible to be manufactured by the thrusting out and drawing in of the tongue, with the glutinous matter of which the French philosopher supposed those threads were formed. It is even found to increase with

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threads. These are attached to the foreign external bodies by means of the foot, a tongue-shaped organ lying at the base of the byssus, distinguished by its dark violet colour, and capable of considerable extension and retraction. There is a furrow drawn along its middle, probably of use in holding the threads while they are fixed without; but you do not perceive any glandular apparatus by which the latter might be secreted, unless this should be a fleshy sheath, which, indeed, does surround the base; and the transition, from the peculiar structure of the muscle to the horny structure of the byssus, is so abrupt, that this looks rather like a new organ than a modification of the one to which it is attached, as Blainville supposes. The accompanyin figure will give a good idea of what h just been described.—ARCANA OF Sc 1832.

(g) M. Mery. Anat. des Moules d'Etang.

the growth of the animal; and as the muscle becomes larger and older, the beard becomes longer and its filaments more strong. I have seen the beards a foot and a half; and of this substance the natives of Palermo sometimes make gloves and stockings.

From this animal the oyster differs very little, except in the thickness of its shell and its greater imbecility. The oyster, like the muscle, is formed with organs of life and respiration, with intestines which are very voluminous, a liver, lungs, and heart. Like the muscle, it is self-impregnated; and the shell, which the animal soon acquires, serves it for its future habitation. Like the muscle, it opens its shell to receive the influx of water, and, like that animal, is strongly attached to its shells both above and below.

But it differs in many particulars. In the first place, its shells are not equal, the one being cupped, the other flat: upon the cupped shell it is always seen to rest; for if it lie upon the flat side, it would then lose all its water. It differs, also, in the thickness of its shells, which are so strongly lined and defended, that no animal will attempt to pierce them. But though the oyster be secured from the attacks of the small reptiles at the bottom, yet it often serves as an object to which they are attached. Pipe-worms and other little animals fix their habitation to the oyster's sides, and in this manner continue to live in security. Among the number of these is a little red worm, that is often found upon the shell; which some, from never seeing oysters copulate, erroneously supposed to be the male by which their spawn was impregnated.

The oyster differs also from the muscle in being utterly unable to change its situation. The muscle, as we have observed, is capable of erecting itself on an edge, and going forward with a slow, laborious motion. The oyster is wholly passive, and endeavours, by all its powers, to rest fixed to one spot at the bottom. It is entirely without that tongue which we saw answer the purposes of an arm in the other animal; but, nevertheless, is often attached very firmly to any object it happens to approach. Rocks, stones, pieces of timber, or sea-weeds, all seem proper to give it a fixture, and to secure it against the agitation of the waves. Nothing is so common in the rivers of the tropical climates as to see oysters growing even amidst the branches of the forest. Many trees which grow along the banks of the stream often bend their branches into the water, and particularly the mangrove, which chiefly delights in a moist situation. To these the oysters hang in clusters, like apples upon the most fertile tree; and in proportion as the weight of the fish sinks the plant into the water, where it still continues growing, the number of oysters increase, and hang upon the branches. Thus there is nothing that these shell-fish will not stick to: they are often even found to stick to each other. This is effected by means of a glue proper to themselves, which, when it cements, the joining is as hard as the shell, and is as difficultly broken. The joining substance, however, is not always of glue, but the animal grows to the rocks, somewhat like the muscle, by threads: although these are only seen to take root in the shell, and not, as in the muscle, to spring from the body of the fish itself.

Oysters usually cast their spawn in May, which at first appear like drops of candle-grease, and stick to any hard substance they fall upon. These are covered with a shell in two or three days; and in three years the animal is large enough to be brought to market. As they invariably remain in the places where they are laid, and as they grow without any other seeming food than the afflux of sea-water, it is the custom at Colchester, and other parts of the kingdom, where the tide settles in marshes on land, to pick up great quantities of small oysters along the shore, which, when first gathered, seldom exceed the size of a sixpence. These are deposited in beds where the tide comes in, and in two or three years grow to a tolerable size. They are said to be better tasted for being us sheltered from the agitations of the deep; and a mixture of fresh water ering into these repositories is said to improve their flavour, and to increase rowth and fatness.*

Spawn.—After the month of to carry away the caltch (the spawn adhering to stones, old oyster-shells, &c.), and punishable to take any oysters, The oysters, however, which are prepared in this manner, are by no means so large as those found sticking to rocks at the bottom of the sea, usually called rock oysters. These are sometimes found as broad as a plate, and are admired by some as excellent food. But what is the size of these compared to the oysters of the East Indies, some of whose shells I have seen two feet over! The oysters found along the coast of Coromandel are capable of furnishing a plentiful meal to eight or ten men; but it seems universally agreed that they are no way comparable to ours for delicacy or flavour.*

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except those of the size of a half-crown piece, or such as, when the two shells are shut, will admit of a shilling rattling between them.

The liquor of the oyster contains incredible multitudes of small embryo oysters, covered with little shells, perfectly transparent, swimming nimbly about. One hundred and twenty of these in a row would extend one inch. Besides these young oysters, the liquor contains a great variety of animalcules, five hundred times less in size, which emit a phosphoric light. The list of inhabitants, however, does not conclude here. for, besides these last mentioned, there are three distinct species of worms (called the oyster-worm), half an inch long, found in oysters, which shine in the dark like glow-worms. The sea-star, cockles, and muscles, are the great enemies of the oyster. The first gets within the shell when they gape, and sucks them out.

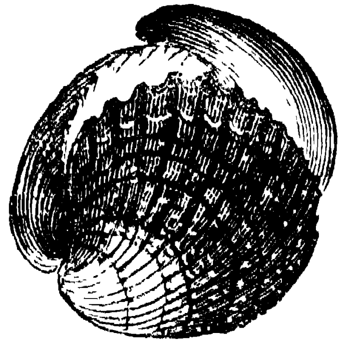
While the tide is flowing, oysters lie with the hollow side downwards, but when it ebbs they turn on the other side.—ARCANA OF SCIENCE, 1829.

* OYSTERS AND THEIR PROPERTIES.—Oysters are conceitedly said to be in season in every month of the year that has an R in its name, beginning with September and ending with April; but the season in many places extends from August to May. Every city has its favourite oyster-bank. In London, the Colchester and Milton oysters are held in most esteem; Edinburgh has her "whispered Pandores," and. latterly, Aberdour oysters; and Dublin, the Carlingford and "Powldoodies of Burran." For the convenience of obtaining a ready supply of oysters, they are often transported from their original beds, and laid down on proper places of the coast; but these exiles are seldom found in such perfection as those which are called *natives*—that is, such as have never been rudely torn from their native homes, and sent on voyages of profit. Oysters, when just dredged, may be so packed in small barrels as to keep good for a week or ten days; and in this state they were sent to distant places. They may also be preserved good for some time by *feeding;* and custom, which brings *gourmands* to admire game most when in a state of putridity, has taught them to relish the flavour of stale oysters better than those recently taken from the beds. The fresher oysters are they are the better, but when to be kept, lay them, bottom downwards, in a tub, or any vessel suited to the quantity to be preserved, and cover them with water in which a good deal of salt is dissolved;—change the water every twelve hours. Most cooks direct that this delicate animal should be fed with oatmeal or flour sprinkled in the water; and others, on the principle which leads a mother of the parish of St. Giles to bathe her new-born darling in a drop of gin, are for feeding them with white wine and bread crumbs! It is said, by those who have the charge of fish-ponds, that "fish will eat nothing but what comes out of the sea;" now, though we are not perfectly convinced of this fact, we can at least believe that salt-water gruel is not over well suited to the delicate stomach of an oyster. Those large, fat oysters, called Pandores, which are so much prized in Edinburgh, are said to owe their superior excellence to the brackish contents of the pans of the adjacent salt-works of Prestonpans flowing out upon the beds, a subject worthy the serious investigation of the oyster amateur, who may here receive some excellent hints for fattening and improving the quality of his favourite morsel.

Shell-fish, and the oyster above all, have long been deemed highly restorative and easy of digestion: they are therefore recommended for the food of the delicate and declining, and of those whose digestive powers have been impaired by excess. When eaten for health, an oyster is best swallowed with its own liquor, the moment the shell is opened: or if found too cold for the stomach, a sprinkling of black pepper may be allowed. Vinegar counteracts the effect of eating oysters to enrich the blood, or render it more balsamic; and ought, therefore, to be avoided by the declining. As there are no reasonable bounds to oyster eating, it may be useful to notice here that, when too many of these or other shell-fish are swallowed, the unpleasant feeling may be removed by drinking half a pint of hot milk. Consumptive persons are recommended to use hot milk after their oysters at all times.

Oysters, says the learned author of *Tabella Cibaria,* were not common at Rome, and, consequently, fetched there a very high price; yet Macrobius assures us, that the Roman pontiffs never failed to have them every day on their tables. From the fourth century to the reign of Louis IV they were nearly for-

The differences are few between bivalved shell-fish: in the great outlines of their nature they exactly resemble each other. It is particularly in this class of shell-fish that pearls are found in greatest abundance; and it is in the internal parts of those shells, that are of a shining, silvery colour, that these gems are usually generated; but the pearl is also found to breed as well in the muscle or the scallop as in the oyster. In fact, it is found in all bivalved shells, the insides of which resemble that well-known substance called mother of pearl.


(The Cockle.)

Whether pearls be a disease or an accident in the animal, is scarce worth inquiry.* The common opinion is, that they are a kind of calculous concretion in the body of the animal, somewhat resembling a stone in the bladder, and are consequently to be considered as a disorder.

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gotten; but they soon came again into vogue, and from that time have kept up their reputation. Gastronomers, we know, can swallow from three to four dozen before dinner, and then sit down and eat, and perhaps better than if they had abstained from them. They clear the stomach of accidental phlegm, and increase the gastric juices; and, by their natural coolness, condense the air which may be fixed in the organs of digestion. When good, they are wholesome, but poisonous when bad. The Athenians held oysters in great esteem, says the same learned authority on the matters of the table; and so, we may add, that, in the Modern Athens, they are held in equal regard.

The principal taverns of the Old City used to be called oyster taverns, in honour of this favourite viand; and this name is still kept up in some modern places of genteel resort. "How many celebrated wits and *bon vivants*, now quite chop-fallen," said Mr. Winterblossom, "have dived into the dark defiles of closes and wynds in pursuit of this delicacy, and of the wine, the wit, the song, that gave it zest. I have heard my learned and facetious friend, the late Professor Creech—for it was rather out of my day—say, that before public amusements were much known in our Presbyterian capital, an oyster *play*, which always included music and a little dance, was the delight of the young fashionables of both sexes."

The municipal authorities were wont to pay considerable attention to the "feast of shells," both as regarded the supply and the price; and, for aught we know, they may do so still. At the commencement of the dredging season, a voyage was boldly undertaken to the oyster-beds in the Frith of Forth by the public functionaries, with something of the solemnity of the Doge of Venice wedding his Adriatic bride. Even the plodding fishermen of our bleak coasts seem to catch inspiration from this delicate creature. Instead of the whiskey inspiration, which supports them in dragging the herring-nets, or throwing the cod-lines, like the fishermen of Sicilian seas, they

> "Sing to charm the spirits of the deep,"

as they troll the dredging-nets. There is, indeed, a poetical notion that the oyster, among his other gentle qualities, is inclined to minstrelsy.—

> "The herring loves the merry moonlight,
> The mackerel loves the wind,
> But the oyster loves the dredging-song,
> For he comes of gentle kind."

MIRROR.

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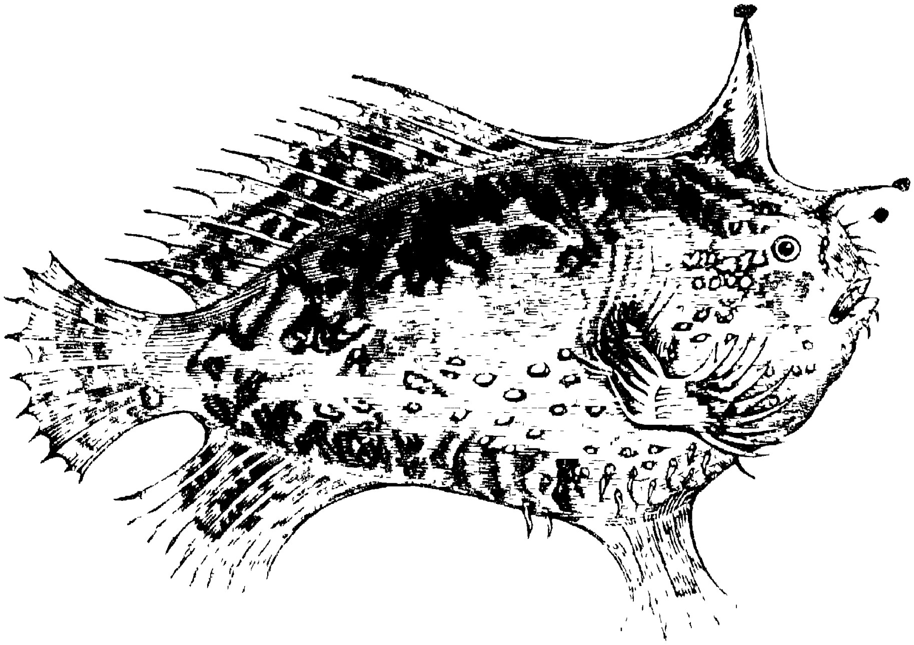
* THE PEARL IN THE OYSTER.—Pearls are not, as poets have feigned,

> "rain from the sky,
> Which turns into pearls as it falls in the sea,"

but they are the morbid secretions of an oyster. Several species of *bivalved* shell-fish produce them, but the greater number, the finest and the largest, are procured from the *Meleagrina margaritifera* (Lamarck), a native of the sea, and of various coasts.

A considerable number are likewise taken from the *Unio margaritifera*, which inhabits the rivers of Europe; and it is singular, as remarked by Humboldt, that though several species of this genus abound in the rivers of South America, no pearls are ever found in them. The pearls are situated either in the body of the oyster, or they lie loose between it and the shell; or, lastly, they are fixed to the latter by a kind of neck; and it is said they do not appear until the animal has reached its fourth year. They have a beautiful lustre, which must be familiar to the reader; but there is nothing peculiar in their chemical composition, consisting merely of carbonate of lime.—ARCANA OF SCIENCE, 1831.



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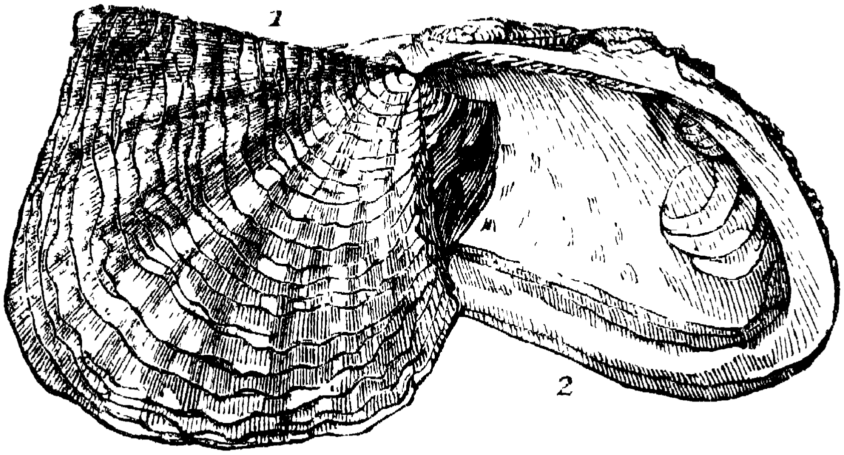


PEARL IN THE OYSTER Page 312

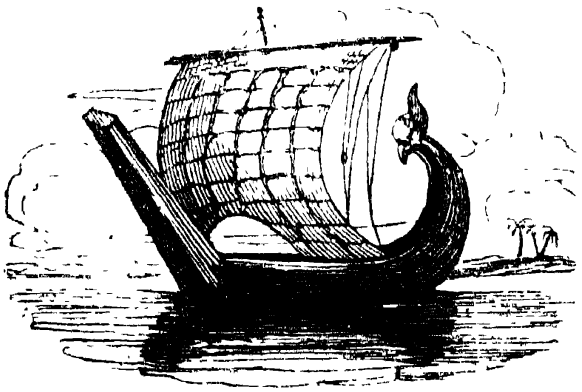
All oysters, and most shell-fish, are found to contain pearls; but that which particularly obtains the name of the pearl oyster, has a large, strong, whitish shell, wrinkled and rough without, and within smooth and of a silver colour. From these the mother-of-pearl is taken, which is nothing more than the internal coats of the shell, resembling the pearl in colour and consistence. This is taken out and shaped into the variety of utensils which are found so beautiful; but the pearl itself is chiefly prized; being found but in few oysters, and generally adhering, sometimes making a print in the body of the shell, sometimes at large within the substance of the fish.

There are a great number of pearl fisheries in America and Asia; but as pearls bear a worse price than formerly, those of America are in a great measure discontinued. The most famous of all the Asiatic fisheries is in the Persian Gulph, near the Isle of Bahren.

The wretched people that are destined to fish for pearls, are either negroes or some of the poorest of the natives of Persia. The inhabitants of this country are divided into tyrants and slaves. The divers are not only subject to the dangers of the deep, to tempests, to suffocation at the bottom, to being devoured by sharks, but from their profession universally labour under a spitting of blood, occasioned by the pressure of air upon their lungs in going down to the bottom. The most robust and healthy young men are chosen for this employment, but they seldom survive it above five or six years. Their fibres become rigid; their eye-balls turn red; and they usually die consumptive.

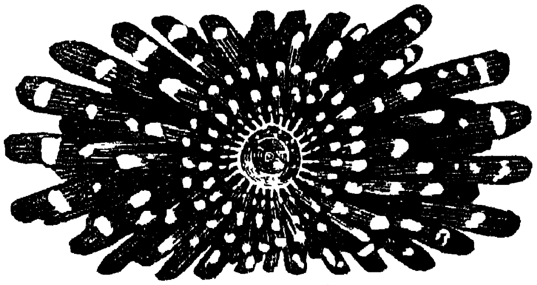
It is amazing how very long they are seen to continue at the bottom. Some, as we are assured, have been known to continue three quarters of an hour under water without breathing; and to one unused to diving, ten minutes would suffocate the strongest.

They fish for pearls, or rather the oysters that contain them, in boats twenty-eight feet long; and of these there are sometimes three or four hundred at a time, with each seven or eight stones, which serve for anchors. There are from five to eight divers belonging to each, that dive one after another. They are quite naked, except that they have a net hanging down from the neck to put their oysters in, and gloves on their hands to defend them while they pick the oysters from the holes in the rocks; for in this manner alone can they be gathered. Every diver is sunk by means of a stone, weighing fifty pounds, tied to the rope by which he descends. He places his foot in a kind of stirrup, and laying hold of the rope with his left hand, with his right he stops his nose to keep in his breath, as upon going down he takes in a very long inspiration. They are no sooner come to the bottom, but they give the signal to those who are in the boat to draw up the stone; which done, they go to work, filling their net as fast as they can; and then giving another signal, the boats above pull up the net loaded with oysters, and shortly after the diver himself, to take a new inspiration.



CHAP. IV.

MULTIVALVE SHELL-FISH.


(Sea Urchin.)

Multivalve Shell-Fish may be considered as animals shut up in round boxes. To view their habitations externally, one would be little apt to consider them as the retreats of living creatures; and still less, to suppose that some of them carry their boxes with a tolerable share of swiftness, so as to escape their pursuers. Of these there are principally two kinds; such as move, and such as are stationary: the first are usually known in our cabinets by the name of sea-eggs the others are as often admired, from the cavities which they scoop out for their habitation in the hardest marble. The first are called, by naturalists, Echini, or Urchins: the latter are called Pholades, or File Fish. Of both there are several sorts; but, by describing these two, we shall have a competent idea of all the rest.

To a slight view, the sea-urchin may be compared to the husk of a chestnut; being like it round, and with a number of bony prickles standing out on every side. To exhibit this extraordinary animal in every light—if we could conceive a turnip stuck full of pins on every side, and running upon these pins with some degree of swiftness, we should have some idea of this extraordinary creature. The mouth is placed downwards; the vent is above; the shell is a hollow vase, resembling a scooped apple; and this filled with a soft, muscular substance, through which the intestines wind from the bottom to the top. The mouth, which is placed undermost, is large and red, furnished with five sharp teeth, which are easily discerned. The jaws are strengthened by five small bones, in the centre of which is a small fleshy tongue; and from this the intestines make a winding of five spires, round the internal sides of the shell, ending at top, where the excrements are excluded. But what makes the most extraordinary part of this animal's conformation, are its horns and its spines, that point from every part of the body, like the horns of a snail, and that serve at once as legs to move upon, as arms to feel with, and as instruments of capture and defence. Between these horns it has also spines that are not endued with such a share of motion. The spines and the horns issue from every part of its body; the spines being hard and prickly; the horns being soft, longer than the spines, and never seen except in the water. They are put forward and withdrawn like the horns of a snail, and are hid at the bases of the spines, serving, as was said before, for procuring food and motion. All this apparatus, however, is only seen when the animal is hunting its prey at the bottom of the water; for a few minutes after it is taken, all the horns are withdrawn into the body, and most of the spines drop off.

It is generally said of insects, that those which have the greatest number of legs, always move the slowest: but this animal seems to be an exception to the rule; for though furnished with two thousand spines, and twelve hundred horns, all serving for legs, and from their number seeming to impede each other's motion, yet it runs with some share of swiftness at the bottom, and it is sometimes no easy matter to overtake it. It is often taken upon the ebb, by following it in shallow water, either in an ozier basket, or simply with the hand. Both the spines and the horns assist its motion; and the animal is usually seen running with the mouth downward.

Some kinds of this animal are as good eating as the lobster; and its eggs, which are of a deep red, are considered as a very great delicacy. But of others the taste is but indifferent; and in all places, except the Mediterranean, they are little sought for, except as objects of curiosity.

Of all animals of the shelly tribe, the Pholades are the most wonderful. From their great powers of penetration, compared with their apparent imbecility, they justly excite the astonishment of the curious observer. These animals are found in different places; sometimes clothed in their proper shell, at the bottom of the water; sometimes concealed in lumps of marly earth; and sometimes lodged, shell and all, in the body of the hardest marble. In their proper shell they assume different figures; but, in general, they somewhat resemble a muscle, except that their shell is found actually composed of five or more pieces, the smaller valves serving to close up the openings left by the irregular meeting of the two principal shells. But their penetration into rocks, and their residence there, make up the most wonderful part of their history.

This animal, when divested of its shell, resembles a roundish, soft pudding, with no instrument that seems in the least fitted for boring into stones, or even penetrating the softest substances. It is furnished with two teeth indeed; but these are placed in such a situation as to be incapable of touching the hollow surface of its stony dwelling: it has also two covers to its shell, that open and shut at either end; but these are totally unserviceable to it as a miner. The instrument with which it performs all its operations, and buries itself in the hardest rocks, is only a broad, fleshy substance, somewhat resembling a tongue, that is seen issuing from the bottom of its shell. With this soft, yielding instrument, it perforates the most solid marbles; and having, while yet little and young, made its way, by a very narrow entrance, into the substance of the stone, it then begins to grow bigger, and thus to enlarge its apartment.

The seeming unfitness, however, of this animal for penetrating into rocks, and there forming an habitation, has induced many philosophers to suppose that they entered the rock while it was yet in a soft state, and from the petrifying quality of the water, that the whole rock afterwards hardened round them by degrees. Thus any penetrating quality, it was thought, was unjustly ascribed to them, as they only bored into a soft substance, that was hardened by time. This opinion, however, has been confuted, in a very satisfactory manner, by Doctor Bohads, who observed, that many of the pillars of the temple of Serapis, at Puteoli, were penetrated by these animals. From thence he very justly concludes, that the pholas must have pierced into them since they were erected; for no workmen would have laboured a pillar into form, if it had been honey-combed by worms in the quarry. In short, there can be no doubt but that the pillars were perfectly sound when erected; and that the pholades have attacked them, during that time in which they continued buried under water, by means of the earthquake that swallowed up the city. (*g*)

From hence it appears that, in all nature, there is not a greater instance of perseverance and patience than what this animal is seen to exhibit. Furnished with the bluntest and softest augre, by slow, successive applications, it effects what other animals are incapable of performing by force; penetrating the hardest bodies only with its tongue. When, while yet naked and very small, it has effected an entrance, and has buried its body in the stone, it there continues for life at its ease; the sea-water that enters at the little aperture supplying it with luxurious plenty.

But they are not supplied only with their rocky habitation; they have also a shell to protect them: this shell grows upon them in the body of the rock, and seems a very unnecessary addition to their defence, which they have procured themselves by art. These shells take different forms, and are often composed of a different number of valves; sometimes six; sometimes but three; sometimes the shell resembles a tube with holes at either end, one for the mouth, and the other for voiding the excrements.

As to the rest, this animal is found in greatest numbers at Ancona, in Italy, it is found along the shores of Normandy and Poitou, in France; it is found also upon some of the coasts of Scotland, and, in general, is considered as a very great delicacy, at the tables of the luxurious.

(g) Bohadsch de Animalibus Marinis, p. 153

CHAP. I.

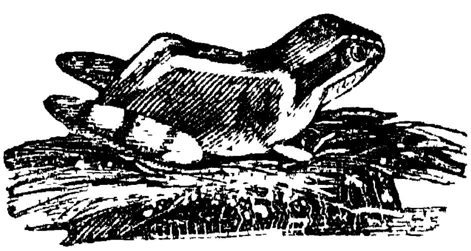
FROGS AND TOADS IN GENERAL.

If we emerge from the deep, the first and most obvious class of amphibious animals that occur upon land are frogs and toads.

To describe the form of animals so well known would be superfluous; to mark those differences that distinguish them from each other may be necessary. The frog moves by leaping; the toad crawls along the ground: the frog is in general less than the toad; its colour is brighter, and with a more polished surface: the toad is brown, rough, and dusty. The frog is light and active, and its belly comparatively small; the toad is slow, swollen, and incapable of escaping. The frog, when taken, contracts itself so as to have a lump on its back; the toad's back is straight and even. Their internal parts are nearly the same, except that the lungs of the toad are more compact than those of the frog: they have fewer air-bladders, and of consequence the animal is less fitted for living under water. Such are the differences with respect to figure and conformation; their habitudes and manners exhibit a greater variety, and require a separate description.

CHAP. II.

THE FROG AND ITS VARIETIES.



(The Frog.)

The external figure of the Frog is too well known to need a description. Its power of taking large leaps is remarkably great, compared to the bulk of its body. It is the best swimmer of all four-footed animals; and Nature hath finely adapted its parts for those ends, the arms being light and active, the legs and thighs long, and furnished with very strong muscles.

If we examine this animal internally, we shall find that it has a very little brain for its size; a very wide swallow; a stomach seemingly small, but capable of great distension. The heart in the frog, as in all other animals that are truly amphibious, has but one ventricle; so that the blood can circulate without the assistance of the lungs, while it keeps under water. The lungs resemble a number of small bladders joined together, like the cells of a honey-comb: they are connected to the back by muscles, and can be distended or exhausted at the animal's pleasure. The male has two testiculi lying near the kidneys; and the female has two ovaries, lying near the same place: but neither male nor female have any of the external instruments of generation.

The Common Brown Frog begins to couple early in the season, and as soon as the ice is thawed from the stagnating waters. In some places the cold protracts their genial appetite till April; but it generally begins about the middle of March. The male is usually of a greyish brown colour; the female is more inclining to yellow, speckled with brown. When they couple, the colours of both are nearly alike on the back; but as they change their skins almost every eighth day, the old one falling off in the form of mucus, the male grows yellower, and the female more brown. In the males the arms and legs are much stronger than in the females; and, at the time of coupling, they have, upon their thumbs, a kind of fleshy excrescence, which they fix firmly to the breast of the female. This Linnæus supposed to be the male instrument of generation; but, by closer inspection, it is found only of service in holding the female in a more strict embrace. It may be cut off, and the impregnation continue unimpaired: it is sometimes found in the opposite sex; and some of the males are found entirely without it: however, when it is cut off, the male cannot hold the female so strongly as before.

The sex couple only once a year: and then continue united sometimes for four days together. At this time they both have their bellies greatly swollen; that of the female being filled with eggs: the male having the skin of the whole body distended with a limpid water, which is ejected in impregnation. As soon as the male has leaped upon the female, he throws his fore legs round her breast, and closes them so firmly, that it is impossible with the naked hands to loose them. The male clasps his fingers between each other, in the same manner as people when they are praying; the thumbs press with their thickest sides against the breast of the female; and though she should struggle ever so much, nothing can induce him to let go his hold. The grasp seems involuntary and convulsive; they cannot be easily torn asunder; and they swim, creep, and live united for some days successively, till the female has shed her spawn, which at length she does almost in an instant. But how the impregnation is performed, without any apparent instruments of generation, has long been an object of inquiry; and still continues in great obscurity.

A single female produces from six to eleven hundred eggs at a time; and, in general, she throws them all out together by a single effort; though sometimes she is an hour in performing this task. While she is thus bringing forth, it may be observed, that the male acts the part of a midwife, and promotes the expulsion of the eggs by working with his thumbs, and compressing the female's body more closely. The eggs which were compressed in the womb, upon being emitted, expand themselves into a round form, and drop to the bottom of the water, while the male swims off, and strikes with his arms as usual, though they had continued so long in a state of violent contraction.

When the spawn is emitted and impregnated by the male, it drops, as was said, to the bottom, and there the white quickly and sensibly increases. The eggs, which during the four first hours suffer no perceptible change, begin then to enlarge and grow lighter; by which means they mount to the surface of the water. At the end of eight hours, the white in which they swim grows thicker, the eggs lose their blackness, and as they increase in size, somewhat of their spherical form. The twenty-first day the egg is seen to open a little on one side, and the beginning of a tail to peep out, which becomes more and more distinct every day. The thirty-ninth day the little animal begins to have motion; it moves at intervals its tail; and it is perceived that the liquor in which it is circumfused, serves it for nourishment. In two days more, some of these little creatures fall to the bottom; while others remain swimming in the fluid around them, while their vivacity and motion is seen to increase. Those which fall to the bottom remain there the whole day; but having lengthened themselves a little, for hitherto they are doubled up, they mount at intervals to the mucus which they had quitted, and are seen to feed upon it with great vivacity. The next day they acquire their tadpole form. In three days more they are perceived to have two little fringes, that serve as fins beneath the head; and these in four days after assume a more perfect form. It is then also that they are seen to feed very greedily upon the pond-weed with which they are to be supplied; and, leaving their former food, on this they continue to subsist till they arrive at maturity. When they come to be ninety-two days old, two small feet are seen beginning to burgeon near the tail; and the head appears to be separate from the body. The next day, the legs are considerably enlarged; four days after they refuse all vegetable food; their mouth appears furnished with teeth; and their hinder legs are completely formed. In two days more the arms are completely produced; and now the frog is every way perfect, except that it still continues to carry the tail. In this odd situation the animal, resembling at once both a frog and a lizard, is seen frequently rising to the surface, not to take food, but to breathe. In this state it continues for about six or eight hours; and then the tail dropping off by degrees, the animal appears in its most perfect form

Thus the frog, in less than a day, having changed its figure, is seen to change its appetites also. So extraordinary is this transformation, that the food it fed upon so greedily but a few days before, is now utterly rejected; it would even starve if supplied with no other. As soon as the animal acquires its perfect state, from having fed upon vegetables it becomes carnivorous, and lives entirely upon worms and insects. But as the water cannot supply these, it is obliged to quit its native element, and seek for food upon land, where it lives by hunting worms and taking insects by surprise.

The frog lives for the most part out of the water; but when the cold nights begin to set in, it returns to its native element, always choosing stagnant waters, where it can lie without danger concealed at the bottom. In this manner it continues torpid, or with but very little motion, all the winter: like the rest of the dormant race, it requires no food; and the circulation is slowly carried on without any assistance from the air.

It is at the approach of spring that all these animals are roused from a state of slumber to a state of enjoyments. A short time after they rise from the bottom they begin to pair, while those that are as yet too young come upon land before the rest.

By comparing their slow growth with their other habitudes, it would appear, that they live about twelve years; but having so many enemies, both by land and water, it is probable that few of them arrive at the end of their term.

Frogs live upon insects of all kinds; but they never eat any, unless they have motion. They continue fixed and immovable till their prey appears; and just when it comes sufficiently near, they jump forward with great agility, dart out their tongues, and seize it with certainty.* The tongue, in this animal, as in the toad, lizard, and serpent kinds, is extremely long, and formed in such a manner that it swallows the point down its throat; so that a length of tongue is thus drawn out, like a sword from its scabbard, to assail its prey. This tongue is furnished with a glutinous substance; and whatever insect it touches, infallibly adheres, and is thus held fast till it is drawn into the mouth.

As the frog is thus supplied with the power of catching its prey, it is also very vivacious, and able to bear hunger for a very long time. I have known one of them continue a month in summer without any other food than the turf on which it was placed in a glass vessel.

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* The Frog taking its Food.—A Correspondent of the *Magazine of Natural History* says, the friend to whom I am indebted for having first called my attention to this amusing exhibition, happened to be repotting some green-house plants, and meeting with a moderate-sized worm among the roots of one of them, he carelessly threw it aside into a damp corner near the green-house. Almost immediately a frog issued from his lurking place hard by, commenced his attack upon the worm, and soon despatched it Another worm was thrown to him, which he treated in the same manner But the amusing part of the business is to watch the manner in which the frog first notices his prey; and this I can compare to nothing so aptly as to what, indeed, it very much resembles, a pointer-dog setting his game; he makes, in short, a dead set at it, oftentimes, too (if the relative position of the two animals so require it), with a slight bend or inclination, more or less, of the forepart of the body to one side, just as we often see a pointer turn suddenly, when the game is on one side of him, and he has approached very near before he has perceived it. After a pause of some seconds or more, the frog makes a dart at the worm, endeavouring to seize it with his mouth; in this attempt he frequently fails more than once; and generally waits for a short interval, acting the pointer, as it were, between each attack. Having succeeded at last in getting the worm into his mouth, if it be a large one, he is unable to swallow it immediately and all at once; and the portion of the worm which yet remains unswallowed, and extends out of the mouth of its destroyer, of course wreaths about, and struggles with a tortuous motion. With much, but somewhat grotesque, dexterity, the frog then employs his two fore feet, shoving and bandying the worm, first with one, and then with the other, in order to keep it as nearly as may be in the centre of his mouth, till the whole is swallowed.

Nor is the frog less tenacious of life. It will live and jump about several hours after its head has been cut off. It will continue active, though all its bowels are taken out; and it can live some days, though entirely stripped of its skin. This cruel trick, which is chiefly practised among school-boys, of skinning frogs, an operation which is done in an instant, seems for some hours no way to abate their vigour. I am assured that some of them get a new skin, and recover after this painful experiment.

The croaking of frogs is well known; and from thence, in some countries, they are distinguished by the ludicrous title of Dutch Nightingales. Indeed, the aquatic frogs of Holland are loud beyond what one would imagine. We could hardly conceive that an animal, not bigger than one's fist, should be able to send forth a note that is heard at three miles' distance; yet such is actually the case.(*g*) The large water frogs have a note as loud as the bellowing of a bull; and, for this purpose, puff up the cheeks to a surprising magnitude. Of all frogs, however, the male only croaks; the female is silent, and the voice in the other seems to be the call to courtship. It is certain, that at these times when they couple, the loudness of their croaking is in some places very troublesome; for then the whole lake seems vocal; and a thousand dissonant notes perfectly stun the neighbourhood. At other times, also, before wet weather, their voices are in full exertion; they are then heard with unceasing assiduity, sending forth their call, and welcoming the approaches of their favourite moisture. No weather-glass was ever so true as a frog in foretelling an approaching change; and, in fact, a German surgeon, it is said, kept his frog for that purpose. It was always heard to croak at the approach of wet weather; but was as mute as a fish when it threatened a continuance of fair. This may probably serve to explain an opinion which some entertain, that there is a month in the year, called Paddock Moon, in which the frogs never croak: the whole seems to be no more than that, in the hot season, when the moisture is dried away, and consequently when these animals neither enjoy the quantity of health nor food that at other times they are supplied with, they show, by their silence, how much they are displeased with the weather. All very dry weather is hurtful to their health, and prevents them from getting their prey. They subsist chiefly upon worms and snails; and as drought prevents these from appearing, the frog is thus stinted in its provisions, and also wants that grateful humidity which moistens its skin, and renders it alert and active.[*]

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[*] Showers of Frogs.—This is a strange phenomenon, of which many instances are on record. The following paragraph is extracted from a late number of the *Belfast Chronicle*:—"As two gentlemen were sitting conversing on a causey pillar, near Bushmills, they were very much surprised by an unusually heavy shower of frogs, half formed, *falling* in all directions; some of which are preserved in spirits of wine, and are now exhibited to the curious by the two resident apothecaries in Bushmills."

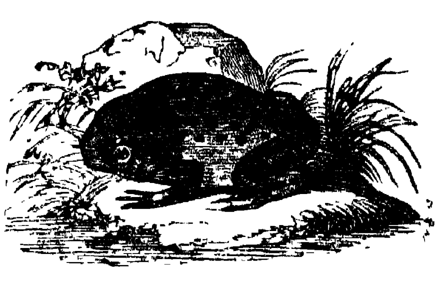
Mr. Loudon says,—"When at Rouen, in September, 1828, I was assured by an English family, resident there, that, during a very heavy thunder shower, accompanied by violent wind, and almost midnight darkness, an innumerable multitude of young frogs fell on and around the house. The roof, the window-sills, and the gravel walks, were covered with them; they were very small, but perfectly formed; all dead; and the next day being excessively hot, they were dried up to so many points, or pills, about the size of the heads of pins. The most obvious way of accounting for this phenomenon, is by supposing the water and frogs of some adjacent ponds to have been taken up by wind in a sort of whirl, or tornado."—Magazine of Nat. Hist.

Frog-Eating.—Frogs at Vienna are a great delicacy. Both the edible (*esculenta*) and the common frog (*temporaria*) are eaten; but the latter is much less esteemed, as its flesh is not so white. The hind legs are in most request. Two pairs of them cost about three half-pence; they are therefore by no means a cheap dish. The fore-legs and livers are mostly used for soup. These poor animals are brought from the country, thirty or forty thousand at a time, and sold to the great dealers, who have conservatories of them. These are large holes, four or five feet deep, dug in the ground, the mouth of which is covered with a board, and with straw in severe weather. In the hard frosts they never become quite torpid, when in these conservatories. There are only three dealers; and most of those which are brought to the market are ready for the cook.

(*g*) Rœsel, ibid.

CHAP. III.

THE TOAD AND ITS VARIETIES.



(The Toad.)

If we regard the figure of the Toad, there seems nothing in it that should disgust more than that of the frog. Its form and proportions are nearly the same; and it chiefly differs in colour, which is blacker; and its slow and heavy motion, which exhibits nothing of the agility of the frog: yet such is the force of habit, begun in early prejudice, that those who consider the one as a harmless, playful animal, turn from the other with horror and disgust. The frog is considered as a useful assistant, in ridding our grounds of vermin; the toad, as a secret enemy, that only wants an opportunity, to infect us with its venom.*

The imagination, in this manner biassed by its terrors, paints out the toad in the most hideous colouring, and clothes it in more than natural deformity. Its body is broad; its back flat; covered with a dusky, pimpled hide; the belly is large and swagging; the pace laboured and crawling; its retreat gloomy and filthy; and its whole appearance calculated to excite disgust and horror: yet upon my first seeing a toad, none of all these deformities in the least affected me with sensations of loathing: born, as I was, in a country where there are no toads, I had prepared my imagination for some dreadful object; but there seemed nothing to me more alarming in the sight, than in that of a common frog; and, indeed, for some time, I mistook and handled the one for the other. When first informed of my mistake, I very well remember my sensations: I wondered how I had escaped with safety, after handling and dissecting a toad, which I had mistaken for a frog. I then began to lay in a fund of horror against the whole tribe, which, though convinced they are harmless, I shall never get rid of. My first imaginations were too strong not only for my reason, but for the conviction of my senses.

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* The Toad.—The progress of natural philosophy has destroyed half the beauty of the celebrated similie of Shakspeare:—

> "Sweet are the uses of adversity;
> Which, like the toad, ugly and venomous,
> Wears yet a precious jewel in its head."

Though the toad is still reputed venomous, yet no one imagines it to have a jewel in its head. This was however believed in Shakspeare's days. Mr. Steevens, the commentator, tells us, that it was the current opinion, that in the head of an old toad was to be found a stone or pearl, to which great virtues were ascribed. Thomas Lupton, in his *First Booke of Notable Things*, 4to. bl. l., bears repeated testimony to the virtues of the "tode-stone, called Crapaudina." In his *Seventh Booke* he instructs how to procure it; and afterwards tells us, "You shall knowe whether the tode-stone be the ryght and perfect stone or not. Holde the stone before a tode, so that he may see it; and if it be a ryght and true stone, the tode will leape towarde it; and make as though he would snatch it. He envieth so much that man should have that stone." It is hardly necessary to say anything more about this jewel, which is of course a mere fantastic invention.

Modern writers express themselves with some doubt when speaking of the supposed venomous nature of the toad. Beck says, in his *Medical Jurisprudence*, "It is doubted at the present day, though formerly it was believed. King John of England is supposed to have been poisoned by a drink in which matter from a living toad had been infused. Pelletier has analyzed the venom of the common toad, and states it to consist of an acid, a very bitter and even caustic fat matter, and an animal matter having some analogy to gelatine. No experiments, however, appear to have been made with it." No scepticism on this point, however, appears to have disturbed that eminent novelist Boccaccio, who has a tale of which the tragic interest depends on the mortal venom of a toad. Two young lovers, Pasquino and Simona, are wandering in a garden, and happen to find a large cluster of sage plants; Pasquino plucks a leaf, and begins to rub his teeth and gums with it, observing that it is very good to do this after eating. He continues his conversation, but in a few minutes a sudden change comes over his countenance, and he expires. Simona is immediately accused by a friend of the deceased of having poisoned him, and taken before a magistrate. This respectable functionary, desirous of investigating the matter thoroughly, proceeds with the parties to the spot where the fatal accident took place, and where the body of Pasquino is lying, swelled up like a toad. Simona, in order to show the exact manner of her lover's death, plucks another sage leaf, and uses it in the same manner, and dies suddenly on the spot. The magistrate, astonished at the catastrophe, observes that this sage is poisonous, which is not usual in the sage. Accordingly, he orders the plant to be rooted up, which is immediately done, when the cause of the death of these unfortunate lovers becomes manifest. Under this plant, says the Italian novelist, there was a wonderfully large toad, by whose venomous breath they perceived that the sage had itself become poisonous.

As the toad bears a general resemblance of figure to the frog, so also it resembles that animal in its nature and appetites. Like the frog, the toad is amphibious; like that animal, it lives upon worms and insects, which it seizes by darting out its length of tongue; and in the same manner also it crawls about in moist weather. The male and female couple as in all the frog kind; their time of propagation being very early in the spring.

When, like the frog, they have undergone all the variations of their tadpole state, they forsake the water; and are often seen, in a moist summer's evening, crawling up by myriads from fenny places, into drier situations. There, having found out a retreat, or having dug themselves one with their mouths and hands, they lead a patient, solitary life, seldom venturing out, except when the moisture of a summer's evening invites them abroad. At that time the grass is filled with snails, and the pathways covered with worms, which make their principal food. Insects also of every kind they are fond of; and we have the authority of Linnæus for it, that they sometimes continue immovable, with the mouth open, at the bottom of shrubs, where the butterflies, in some measure fascinated, are seen to fly down their throats. (*g*)

In a letter from Mr. Arscott, there are some curious particulars relating to this animal, which throws great light upon its history.* "Concerning the toad," says he, "that lived so many years with us, and was so great a favourite, the greatest curiosity was its becoming so remarkably tame: it had frequented some steps before our hall door some years before my acquaintance commenced with it, and had been admired by my father for its size (being the largest I ever met with), who constantly paid it a visit every evening. I knew it myself above thirty years; and by constantly feeding it, brought it to be so tame, that it always came to the candle and looked up, as if expecting to be taken up and brought upon the table, where I always fed it with insects of all sorts. It was fondest of flesh maggots, which I kept in bran; it would follow them, and when within a proper distance, would fix his eyes and remain motionless, for near a quarter of a minute, as if preparing for the stroke, which was an instantaneous throwing its

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* Reclaimed Toads.—There have been many instances of toads being tamed. Mr Arscott mentions one which lived upwards of thirty-five years. Not the least wonderful part of the history of the toad, is the circumstance of its being frequently found alive in the heart of solid rocks, and internal cavities of trees. In 1777, Herissant undertook some experiments to ascertain the truth of what has been related on this point. He shut up three toads in sealed boxes in plaster, and they were deposited in the Academy of Sciences. At the end of eighteen months, the boxes were opened, and one of these toads was dead, but the other two were still living. Nobody could doubt the authenticity of this fact; yet the experiments were severely criticized, as well as the observations which they seemed to confirm. It was contended that the air must have come to these animals through some imperceptible hole, which escaped the notice of the observer. Some probability was given to this supposition by the researches of Dr. Edwards, published in 1817. He has observed, that toads shut up totally in plaster, and absolutely deprived of air, lived for a greater number of days, and much longer than those which were forced to remain under water. This certainly is one of the most extraordinary phenomena which the history of the physiology of reptiles can furnish, and seems to be an exception to the rule that air is indispensable to animal life. It appears, however, that in the above instance, some air did penetrate the plaster, as Dr. Edwards afterwards proved by the fact, that as soon as the plaster which inclosed them was placed under water, the toads perished. The opponents of Herissant were therefore justified to a certain extent in their scepticism Still the facts of animals existing so long a time under such circumstances, even with a little air, is most surprising, and calculated to produce very strange reflections. If these reptiles lived in this manner longer than they would have done in the open dry air, the reason must be, that they had lost less by transpiration; and if they died much later than they would have done in water, it was because the air certainly had some access to them.

Professor Buckland has recently made some experiments, in order to throw light on this

(*g*) Amænit, vol vi. p 201.

obscure subject. Two blocks of stone were taken, one of porous oolite limestone, and one of a compact silicious sandstone; twelve cells, five inches wide, and six inches deep, were cut in the sandstone, and twelve others, five inches wide, and twelve inches deep, in the limestone. In November, 1825, one live toad was placed in each of the twenty-four cells, its weight being previously ascertained with care. A glass plate was placed over each cell as a cover, with a circular slate above to protect it; and the two blocks of stone, with the immured toads, were buried in Dr. Buckland's garden under three feet of earth. They were uncovered after the lapse of a year, in December, 1826. All the toads in the small cells of compact sandstone were dead, and their bodies so much decayed as to prove that they had been dead for some months. The greater number of the toads in the larger cells of porous limestone were alive; but they were all a good deal emaciated, except two, which had increased in weight, the one from one thousand one hundred and eighty-five grains to one thousand two hundred and sixty-five, the other from nine hundred and eighty-eight to one thousand one hundred and sixteen. With regard to these two, Dr. Buckland thinks they had both been nourished by insects, which had got into the one cell through a crack found in the glass cover, and into the other probably by some small aperture in the luting, which was not carefully examined. No insects were found in either cell, but an assemblage of insects were found on the outside of another glass, and a number within one of the cells whose cover was cracked, and where the animal was dead. Of the emaciated toads, one had diminished in weight from nine hundred and twenty-four grains to six hundred and ninety-eight, and one from nine hundred and thirty-six to six hundred and fifty-two. "The results of the experiments," says Dr. Buckland, "amount to this:—All the toads, both large and small, inclosed in the sandstone, and the small toads inclosed in the limestone also, were dead at the end of thirteen months. Before the expiration of the second year, all the large ones also were dead. These were examined several times, during the second year, through the glass covers of the cells, but without removing them to admit air. They appeared always awake, with their eyes open, and never in a state of torpor, their meagreness increasing at each interval, until at length they were found dead. Those which had gained an increase of weight at the end of the first year, and were then carefully closed up again, were emaciated and dead before the expiration of the second year." Four toads, inclosed in cavities cut in the trunk of an apple tree, and closed up by plugs so tightly as to exclude insects, and "apparently air," were found dead at the end of a year.

The phenomena, then, of live toads inclosed in rocks, he explains in this way. The young toad, as soon as it leaves its tadpole state, and emerges from the water, seeks shelter in holes and crevices of rocks and trees. One may thus enter a small opening in a rock, and when there find food, by catching the insects which seek shelter in the same retreat; and its increase of size may prevent it from getting out again by the same opening. It is probable that there are some small apertures in all the stones in which toads are found, though they escape the notice of the workmen, who have no motive to induce them to make a narrow examination. In other cases, there may have been an opening, which had been closed up, after the animal was immured, by stalactitic incrustation. Deprived of food and air, it might fall into that state of torpor, or suspended animation, to which certain animals are subject in winter; but how long it might continue in this state is uncertain.

The Rev. George Young, in his *Geological Survey of the Yorkshire Coast*, second edition, 1828, mentions several recent instances of living toads having been found within solid blocks of sandstone. "We are the more particular in recording these facts," he observes, "because some modern philosophers have attempted to explode such accounts as wholly fabulous." Mr. Jesse informs us, that he knew a gentleman who put a toad into a small flower-pot, and secured it, so that no insect could penetrate it, and then buried it so deep in his garden that it was secured against the influence of frost. At the end of twenty years he took it up, and found the toad increased in bulk, and healthy.—White's Natural History of Selborne.

tongue at a great distance upon the insect, which stuck to the tip by a glutinous matter. The motion is quicker than the eye can follow. I cannot say how long my father had been acquainted with the toad before I knew it, but when I was first acquainted with it, he used to mention it as the old toad I have known so many years. I can answer for thirty-six years. This old toad made its appearance as soon as the warm weather came; and I always concluded it retired to some dry bank to repose till spring. When we new layed the steps, I had two holes made in the third step, on each with a hollow of more than a yard long for it; in which I imagine it slept, as it came from thence at its first appearance. It was seldom provoked. Neither that toad, nor the multitudes I have seen tormented with great cruelty, ever showed the least desire of revenge, by spitting or emitting any juice from their pimples.* Sometimes, upon taking it up, it would let out a great quantity of clear water, which, as I have often seen it do the same upon the steps when quite quiet, was certainly its urine, and no more than a natural evacuation. Spiders, millepedes, and flesh maggots, seem to be this animal's favourite food. I imagine if a bee was to be put before a toad, it would certainly eat it to its cost; (g) but as bees are seldom stirring at the same time that toads are, they rarely come in their way; as they do not appear after sun-rising, or before sun-set. In the heat of the day they will come to the mouth of their hole, I believe for air. I once, from my parlour window, observed a large toad I had in the bank of a bowling-green, about twelve at noon, a very hot day, very busy and active upon the grass. So uncommon an appearance made me go out to see what it was; when I found an innumerable swarm of winged ants had dropped round his hole; which temptation was as irresistible as a turtle would be to a luxurious alderman. In respect to its end, had it not been for a tame raven, I make no doubt but it would have been now living. This bird, one day seeing it at the mouth of its hole, pulled it out, and, although I rescued it, pulled out one eye, and hurt it so, that notwithstanding its living a twelvemonth, it never enjoyed itself, and had a difficulty of taking its food, missing the mark for want of its eye. Before that accident, it had all the appearance of perfect health."

From all this it will appear with what injustice this animal has hitherto been treated. It has undergone every reproach, and mankind have been taught to consider as an enemy a creature that destroys that insect tribe which are their real invaders. We are to treat, therefore, as fables, those accounts that represent the toad as possessed of poison to kill at a distance; of its ejecting its venom, which burns wherever it touches; of its infecting those vegetables near which it resides; of its excessive fondness for sage, which it renders poisonous by its approach: these, and a hundred others of the same kind, probably took rise from an antipathy which some have to all animals of the kind. It is a harmless, defenceless creature, torpid and unvenomous, and seeking the darkest retreats, not from the malignity of its nature, but the multitude of its enemies.

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* IMPUTED VENOM OF THE TOAD.—The Toad is truly a venomous reptile, but its venom lies all in its skin, in the protuberances on its back. When provoked or hurt, it will discharge at these protuberances small particles of white poison: hence there are few dogs that will worry a toad; but a good dog will fasten upon anything. I have seen the mouths of dogs swelled fearfully from worrying toads. —CORRESPONDENT MAG. OF NAT. HIST.

In confirmation of the foregoing, at a recent lecture by Dr. E. J. Clarke on this subject, quoted in the *Mirror*, that gentleman says, "The opinions of the vulgar are generally founded upon something. That the toad spits poison has been treated as ridiculous; but though it may be untrue that what the creature spits affects man, yet I am of opinion that it does spit venom. A circumstance related to me by a friend of mine, has tended to strengthen my opinion. He was a timber merchant, and had a favourite cat, who was accustomed to stand by him while he was removing the timber; when (as was often the case) a mouse was found concealed among it, the cat used to kill it. One day the gentleman was at his usual employment, and the cat standing by him, when she jumped on what he supposed to be a mouse, and immediately uttered a loud cry of agony; she then stole away into a corner of the yard, and died in a few minutes. It turned out that she had jumped on a toad."

(g) Ræsel tried a frog; it swallowed the bee alive: its stomach was stung, and the animal vomited it up again.

Like all of the frog kind, the toad is torpid in winter. It chooses then for a retreat either the hollow root of a tree, the cleft of a rock, or sometimes the bottom of a pond, where it is found in a state of seeming insensibility. As it is very long-lived, it is very difficult to be killed; its skin is tough, and cannot be easily pierced; and, though covered with wounds, the animal continues to show signs of life, and every part appears in motion. But what shall we say to its living for centuries lodged in the bosom of a rock, or cased within the body of an oak tree, without the smallest access on any side, either for nourishment or air, and yet taken out alive and perfect! Stories of this kind it would be as rash to contradict as difficult to believe; we have the highest authorities bearing witness to their truth, and yet the whole analogy of nature seems to arraign them of falsehood. Bacon asserts that toads are found in this manner; Doctor Plot asserts the same; there is to this day a marble chimney-piece at Chatsworth with the print of the toad upon it, and a tradition of the manner in which it was found. In the Memoirs of the Academy of Sciences there is an account of a toad found alive and healthy in the heart of a very thick elm, without the smallest entrance or egress. (*g*) In the year 1731, there was another found near Nants, in the heart of an old oak, without the smallest issue to its cell; and the discoverer was of opinion, from the size of the tree, that the animal could not have been confined there less than eighty or a hundred years, without sustenance, and without air. To all these we can only oppose the strangeness of the facts; the necessity this animal appears under of receiving air; and its dying, like all others, in the air-pump, when deprived of this all-sustaining fluid. But whether these be objections to weigh against such respectable and disinterested authority, I will not pretend to determine; certain it is, that, if kept in a damp place, the toad will live for several months without any food whatsoever.*

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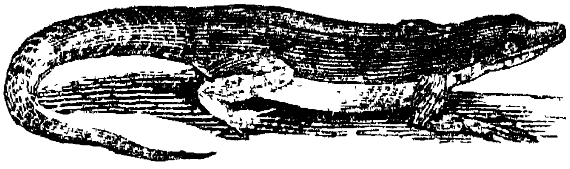
* Frogs and Toads.—Dr. Edwards, an Englishman, resident at Paris, has recently been engaged in several important experiments for ascertaining the influence of physical agents on life. He inclosed 10 out of 15 frogs in thick wooden boxes, and filled the interstices with plaster, covering them over with the same substance, the toads lying each in a central hole or bed. The other five toads were at the same time submersed in water, and at the expiration of 8 hours they were found to be dead. In 16 hours more one toad was taken from a box and found to be lively, and was reconsigned to its prison. On the 16th day the toads in the boxes were discovered alive, and thus the fact was established that these animals can live far longer in a state of asphyxy confined in solid substances, than when submersed in water. This was confirmed by repeated trials on salamanders, frogs, and toads. The frogs perished quickest.

Thus an extraordinary fact is established as regarding reptiles, since it affords an exception to the general rule, that *all animals require a* CONSTANT *supply of fresh air for the maintenance of their existence.* Similar trials were repeated in sand, and with the same results. Dr. Edwards found, that although a certain quantity of air enters the boxes and sand, yet that it is far too little to maintain life. His conclusion, therefore, stands, that animals of the kind employed can live longer in *solid substances* than in a limited quantity of *dry air.*—Brande's Journal.

(*g*) Vide the year 1719.

CHAP. IV.

LIZARDS IN GENERAL.



(The Warty Lizard.)

THERE is scarcely a naturalist that has treated of Lizards, but has a particular manner of ranking them, in the scale of animated nature. Ray, rather struck with the number of their legs, than their habits and conformation, has exalted them among quadrupeds; while Linnæus, attentive only to their long slender forms, has degraded them among serpents. Brisson gives them a distinct class by themselves, under the name of Reptiles.

It is indeed no easy matter to tell to what class in nature lizards are chiefly allied.

As lizards thus differ from every other class of animals, they also differ widely from each other. With respect to size, no class of beings has its ranks so opposite. What, for instance, can be more removed than the small Chameleon, an inch long, and the Alligator of the river Amazons, above twenty-seven feet? To an inattentive observer, they would appear entirely of different kinds; and Seba wonders how they ever came to be classed together.*

The colour of these animals also is very various, as they are found of a hundred different hues, green, blue, red, chestnut, yellow, spotted, streaked, and marbled. Were colour alone capable of constituting beauty, the lizard would often please; but there is something so repressing in the animal's figure, that the brilliancy of its scales, or the variety of its spots, only tend to give an air of more exquisite venom of greater malignity. The figure of these animals is not less various: sometimes swollen in the belly; sometimes pursed up at the throat; sometimes with a rough set of spines on the back, like the teeth of a saw; sometimes with teeth, at others with none; sometimes venomous, at others harmless, and even philanthropic; sometimes smooth and even; sometimes with a long, slender tail; and often with a shorter blunt one.

But their greatest distinction arises from their manner of bringing forth their young. Firstly, some of them are viviparous. Secondly, some are oviparous; and which may be considered in three distinct ways. Thirdly, some bring forth small spawn, like fishes. The Crocodile, the Iguana, and all the larger kinds, bring forth eggs, which are hatched by the heat of the sun: the animals that issue from them are complete upon leaving the shell; and their first efforts are to run to seek food in their proper element. The viviparous kinds, in which are all the salamanders, come forth alive from the body of the female, perfect and active, and suffer no succeeding change.

From hence it appears, that of this tribe there are three distinct kinds, differently produced, and most probably very different in their formation. But the history of these animals is very obscure; and we are as yet incapable of laying the line that separates them. All we know, as was said before, is, that the great animals of this kind are *mostly* produced perfect from the egg; the salamanders are *generally* viviparous; and *some* of the water lizards imperfectly produced. In all these most unfinished productions of Nature, if I may so call them, the varieties in their structure increases in proportion to their imperfections. A poet would say, that Nature grew tired of the nauseous formation; and left accident to finish the rest of her handy work.

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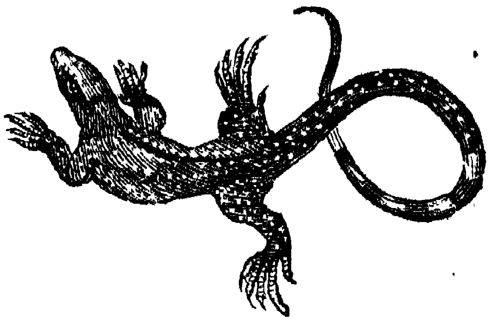
* **STUPENDOUS LIZARD.**—Mr. Bullock, in his Travels (lately published), relates, that he saw near New Orleans, "what are believed to be the remains of a stupendous crocodile, and which are likely to prove so, intimating the former existence of a lizard at least 150 feet long; for I measured the right side of the under jaw, which I found to be 21 feet along the curve, and 4 feet 6 inches wide; the others consisted of numerous vertebræ, ribs, femoral bones, and toes, all corresponding in size to the jaw: there were also some teeth; these, however, were not of proportionate magnitude. These remains were discovered a short time since, in the swamp near Fort Philip, and the other parts of the mighty skeleton are, it is said, in the same part of the swamp."


(The Monitor Lizard.)

However, the three kinds have many points of similitude; and, in all their varieties of figure, colour, and production, this tribe is easily distinguished, and strongly marked. They have all four short legs; the two fore feet somewhat resembling a man's hand and arm. They have tails almost as thick as the body at the beginning, and that generally run tapering to a point. They are all amphibious also; equally capable of living upon land and water: and formed internally in the same manner with the tortoise, and other animals, that can continue a long time without respiration: in other words, their lungs are not so necessary to continue life and circulation, but that their play may be stopped for some considerable time, while the blood performs its circuit round the body by a shorter communication.

These are differences that sufficiently separate lizards from all other animals; but it will be very difficult to fix the limits that distinguish the three kinds from each other. The *crocodile* tribe, and its affinities, are sufficiently distinguished from all the rest, by their size and fierceness; the *salamander* tribe is distinguished by their deformity, their frog-like heads, the shortness of their snouts, their swollen belly, and their viviparous production. With regard to the rest, which we may denominate the chameleon or lizard kind, some of which bring forth from the egg, and some of which are imperfectly formed from spawn, we must group them under one head, and leave time to unravel the rest of their history.*

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* BICEPHALOUS LIZARD.—On the 9th of May, M Beltrami communicated to the Royal Academy of Sciences of Paris, some curious particulars relative to a two-headed lizard, which lived five months in the possession of M. Rigal, an apothecary at Argelles It used its two heads simultaneously for eating when it could seize its food as it liked. If a single insect were presented to it, both heads attempted to seize it, and the one which failed endeavoured to snatch it from the other. When, however, one head was satiated, the other refused food, but if water were offered, the head which had not eaten would drink for the other, which then, in its turn, refused to drink when its companion was satisfied. The animal has five feet, four of which, placed in the usual position, served it for locomotion; the fifth is situated at the point of junction of the two necks, at the upper part of the common body. It has nine distinct toes, evidently resulting from the union of the two fore-feet. This foot, or paw, served it to clean itself, and to carry the food alternately to the two mouths; and it was remarked that it never presented food to the same head twice in succession, and if it had commenced with the right hand one, it invariably finished with the left. The two heads and necks are of equal dimensions, and perfectly well formed. M. Rigal had endeavoured to preserve the animal from the cold of the winter before last, by keeping it in bed during the night, and found it one morning smothered to death. It has been preserved in spirits of wine, and deposited with the Secretary of the Academy.—JOURNAL OF THE ROYAL INSTITUTION.

THE WINGED LIZARD.—The pterodactylus, or winged lizard, one of the most extraordinary productions of the fossil world, is an animal which forms the intermediate link, hitherto deemed to exist only in fable, between birds and reptiles.

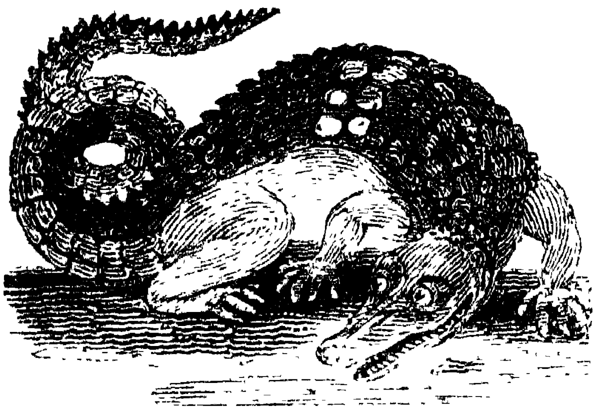
This creature, previously known in two formations upon the continent, has been recently recognised in the lias of Dorsetshire.

We cannot resist the temptation to introduce this remarkable animal in the language of Professor Buckland:—

" In size and general form, and in the dis-

CHAP. V.

THE CROCODILE AND ITS AFFINITIES.



(The Crocodile.)

The crocodile is an animal placed at a happy distance from the inhabitants of Europe, and formidable only in those regions where men are scarce, and arts are but little known. In all the cultivated and populous parts of the world, the great animals are entirely banished, or rarely seen. The appearance of such raises at once a whole country up in arms to oppose their force; and their lives generally pay the forfeit of their temerity. The crocodile, therefore, that was once so terrible along the banks of the river Nile, is now neither so large, nor its numbers so great as formerly. The arts of mankind have, through a course of ages, powerfully operated to its destruction; and, though it is sometimes seen, it appears comparatively timorous and feeble.*

To look for this animal in all its natural terrors,† grown to an enormous size, propagated in surprising numbers, and committing unceasing devastations, we must go to the uninhabited regions of Africa and America, to those immense

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position and character of its wings, this fossil genus, according to Cuvier, somewhat resembled our modern bats and vampyres, but had its beak elongated, like the bill of a woodcock, and armed with teeth, like the snout of a crocodile; its vertebræ, ribs, pelvis, legs, and feet, resembled those of a lizard, its three anterior fingers terminated in long hooked claws, like that on the fore-finger of the bat; and over its body was a covering, neither composed of feathers, as in the bird, nor of hair, as in the bat, but of scaly armour, like that of an iguana: in short, a monster, resembling nothing that has ever been seen or heard of upon earth, excepting the dragons of romance and heraldry. Moreover, it was probably noctivagous and insectivorous, and in both these points resembled the bat; but differed from it, in having the most important bones in its body constructed after the manner of those of reptiles. With flocks of such like creatures flying in the air, and shoals of no less monstrous ichthyosauri and plesiosauri swarming in the ocean, and gigantic crocodiles and tortoises crawling on the shores of the primeval lakes and rivers,—air, sea, and land must have been strangely tenanted in those early periods of our infant world."—M. R. C. TAYLOR'S ILLUSTRATIONS OF ANTEDILUVIAN ZOOLOGY.

* THE LEVIATHAN OF SCRIPTURE.—The Israelites, to whom, from their residence in Egypt, the products of that country were familiar, appear to have had an accurate knowledge of the habits of this terrific monster. We find in chap. xli. of Job, the graphic and sublime description of an animal under the name of leviathan, which well applies to that species which infested, and still infests, the prolific waters of the Nile. The crocodile is an animal which attains an enormous size; some have been found, it is said, measuring upwards of twenty feet. Its skin (if skin it may be called) consists of horny plates or laminæ, of great strength and thickness, so as to be proof on the back against a musket-ball. "His scales are his pride, shut up together as with a close seal;" hence, before modern weapons were known, it must have appeared madness to attack him,—"Canst thou fell his skin with barbed irons, or his head with fish-spears? Lay thine hand upon him, remember the battle; do no more." The crocodile darts upon his victim, cleaving the waters like an arrow, and leaving a track behind him from the impetuosity of his progress: "he maketh a path to shine after him; one would think the deep to be hoary."

† HABITS.—In reference to the passage in Job respecting the habits of the crocodile, we

rivers that roll through extensive and desolate kingdoms, where arts have never penetrated, where force only makes distinction, and the most powerful animals exert their strength with confidence and security. Those that sail up the river Amazons, or the river Niger, well know how numerous and terrible those animals are in such parts of the world.

Of this terrible animal there are two kinds; the Crocodile, properly so called, and the Cayman or Alligator. Travellers, however, have rather made the distinction than nature; for in the general outline, and in the nature of these two animals they are entirely the same. It would be speaking more properly to call these animals the crocodiles of the eastern and the western world; for in books of voyages, they are so entirely confounded together, that there is no knowing whether the Asiatic animal be the crocodile of Asia, or the alligator of the western world. The distinctions usually made between the crocodile and alligator are these: the body of the crocodile is more slender than that of the alligator; its snout runs off tapering from the forehead, like that of a greyhound; while that of the other is indented, like the nose of a lap-dog. The crocodile has a much wider swallow, and is of an ash-colour; the alligator is black, varied with white, and is thought not to be so mischievous. All these distinctions, however, are very slight, and can be reckoned little more than minute variations.

These animals grow to a great length, being sometimes found thirty feet long, from the tip of the snout to the end of the tail: their most usual length, however, is eighteen.

They are seen, in some places, lying for whole hours, and even days, stretched in the sun, and motionless; so that one not used to them, might mistake them for trunks of trees, covered with a rough and dry bark; but the mistake would soon be fatal, if not prevented: for the torpid animal, at the near approach of any living thing, darts upon it with instant swiftness, and at once drags it down to the bottom. In the times of an inundation, they sometimes enter the cottages of the natives, where the dreadful visitant seizes the first animal it meets with. There have been several examples of their taking a man out of a canoe in the sight of his companions, without their being able to lend him any assistance.

The strength of every part of the crocodile is very great; and its arms, both offensive and defensive, irresistible. We have seen, from the shortness of its legs, the amazing strength of the tortoise: but what is the strength of such an animal, compared to that of the crocodile, whose legs are very short and whose size is so superior. The back-bone is jointed in the firmest manner; the muscles of the fore and hinder legs are vigorous and strong; and its whole form calculated for force. Its teeth are sharp, numerous, and formidable; its claws are long and tenaceous; but its principal instrument of destruction is the tail: with a single blow of this it has often overturned a canoe, and seized upon the poor savage its conductor.

Though not so powerful, yet it is very terrible even upon land. The crocodile seldom, except when pressed by hunger, or with a view of depositing its eggs, leaves the water. Its usual method is to float along upon the surface and seize whatever animals come within its reach; but when this method fails, it then goes closer to the bank. Disappointed of its fishy prey, it there waits covered up among the sedges, in patient expectation of some land animal that comes to

may notice a fact related by travellers who have witnessed the manners of this animal in its native country. An enormous crocodile, basking among the reeds near the shore, will sometimes suddenly dart out into the middle of the lagoon, glaring with his eyes, swelling out his body to the utmost, and then whirling round and round, uttering a horrible sound, and lashing furiously with his tail, till the [illegible] has been worked into a foam; this [illegible] he again darts away to his reedy covert, and lies inactive and motionless as before: "He maketh the deep to boil like a pot, he maketh the sea like a pot of ointment." Mr. Waterton describes the bellowing of the alligator as commencing in "a suppressed sigh, suddenly bursting forth so loudly that you might hear it above a mile off." This may have given rise to the story of the crocodile imitating the cry of a human being in distress, for the purpose of alluring a victim, which is altogether fabulous.—Ed.

drink; the dog, the bull, the tiger, or man himself. Nothing is to be seen of the insiduous destroyer as the animal approaches; nor is its retreat discovered till it be too late for safety. It seizes the victim with a spring, and goes at a bound much faster than so unwieldy an animal could be thought capable of exerting: then having secured the creature with both teeth and claws, it drags it into the water, instantly sinks with it to the bottom, and in this manner quickly drowns it.[*]

In this manner the crocodile seizes and destroys all animals, and is equally dreaded by all. There is no animal but man alone that can combat it with success. We are assured by Labat, that a negro, with no other weapons than a knife in his right hand, and his left arm wrapped round with a cow-hide, ventures boldly to attack this animal in its own element. As soon as he approaches the crocodile, he presents his left arm, which the animal swallows most greedily; but sticking in its throat, the negro has time to give it several stabs under the throat; and the water also getting in it at the mouth, which is held involuntarily open, the creature is soon bloated up as big as a tun, and expires.

Whatever be the truth of these accounts, certain it is that crocodiles are taken by the Siamese in great abundance. The natives of that empire seem particularly fond of the capture of all the great animals with which their country abounds. We have already seen their success in taking and taming the elephant; nor are they less powerful in exerting their dominion over the crocodile. The manner of taking it in Siam is by throwing three or four strong nets across a river, at proper distances from each other; so that if the animal breaks through the first, it may be caught by one of the rest. When it is first taken, it employs the tail, which is the grand instrument of strength, with great force; but after many unsuccessful struggles, the animal's strength is at last exhausted. Then the natives approach their prisoner in boats, and pierce him with their weapons in the most tender parts till he is weakened with the loss of blood. When he has done stirring, they begin by tying up his mouth, and with the same cord they fasten his head to his tail, which last they bend back like a bow. However, they are not yet perfectly secure from his fury; but, for their greater safety, they tie his fore feet as well as those behind to the top of his back. These precautions are not useless; for if they were to omit them, the crocodile would soon rocover strength enough to do a great deal of mischief.

The crocodile thus brought into subjection, or bred up young, is used to divert and entertain the great men of the east. It is often managed like a horse; a curb is put into its mouth, and the rider directs it as he thinks proper.[†]

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[*] Alligators Swallowing Stones.—The Indians on the banks of the Oronoko assert, that previously to an alligator going in search of prey, it always swallows a large stone, that it may acquire additional weight to aid it in diving and dragging its victims under water. A traveller being somewhat incredulous on this point, Bolivar, to convince him, shot several with his rifle, and in all of them were found stones varying in weight according to the size of the animal. The largest killed was about 17 feet in length, and had within him a stone weighing about 60 or 70 pounds.

Audubon, the American naturalist, affirms to the contrary, that the substances found was hard as stones, which *outwardly* they resemble very much. He says they more look like petrified wood. These masses appeared to be useful to the animal in the process of digestion, like those found in the craws of some species of birds.—Jameson's Journal.

[†] Riding on the Back a Crocodile.—Many people on possessing the original and highly interesting *Wanderings in South America*, by Charles Waterton, Esq., altogether disbelieve his account of catching the crocodile, or, as it is there called, the *cayman*, and laugh at the extreme improbability of his having "jumped on his back," in order to conquer him. This the greater part of his readers have looked upon as a fiction; and others have considered it as a downright falsehood. The following observations, therefore, will tend to counteract this idea, and to show that it has actually been the custom, among some nations, both in ancient and modern times, to mount on the backs of crocodiles, that these animals may be taken with more facility and safety.

Pliny, in his *Natural History*, describes the manner of catching crocodiles, (which is thus translated):—

"There is a race of men hostile to the crocodile, called Tentyritæ, from an island in the Nile itself, which they inhabit. Their stature

Though awkwardly formed, it does not fail to proceed with some degree of swiftness; and is thought to move as fast as some of the most unwieldy of our own animals, the hog or the cow. Some, indeed, assert that no animal could escape it, but for its difficulty in turning; but to this resource we could wish none would trust who are so unhappy as to find themselves in danger.

Along the rivers of Africa this animal is sometimes taken in the same manner as the shark. Several Europeans go together in a large boat, and throw out a piece of beef upon a hook and strongly fortified line, which the crocodile seizing and swallowing, is drawn along, floundering and struggling until its strength is quite exhausted, when it is pierced in the belly, which is its tenderest part; and thus after numberless wounds is drawn ashore. In this part of the world also, as well as at Siam, the crocodile makes an object of savage pomp near the palaces of their monarchs. Philips informs us that at Sabi, on the Slave-coast, there are two pools of water near the royal palace, where crocodiles are bred as we breed carp in our ponds in Europe.

It is probable that the smell of musk, which all these animals exhale, may render them agreeable to the savages of that part of Africa. They are often known to take the part of this animal which contains the musk, and wear it as a perfume about their persons. Travellers are not agreed in what part of the body these musk-bags are contained: some say in the ears; some, in the parts

is small, but their courage in this practice is wonderful. This beast is terrible to them that flee from him, but runs away from his pursuers, and these men alone dare attack him. Moreover, they swim after him in the river, and mounting on his back, like horsemen, as he opens his jaws to bite, with his head turned up, they thrust a club into his mouth, and holding the ends of it, one in the right hand, and the other in the left, they bring him to shore captive, as if with bridles, and so frightened with their shouts only, that they compel him to disgorge the bodies he had but just swallowed, in order to be buried."

In a rare and very singular book of field-sports, containing one hundred and one coloured plates, to which are annexed four lines in Latin, descriptive of each subject, *tab.* 88, represents, most probably from this account of Pliny, some men riding on crocodiles, and bringing them to land by means of a pole across their mouths, whilst others are killing the beasts with large clubs. The following are the verses under it (translated):

"Tentyra, an island of the Nile, in Egypt, is inhabited by an intrepid people, who climb the crocodile's back, and bridling his mouth with a staff, force him out of the river, and slay him."

Dr Pocoke, in his observations on Egypt, mentions a method of taking the crocodile still more like that which our author practised in South America. He says, "they make some animal cry at a distance from the river, and when the crocodile comes out, they thrust a spear into his body, to which a rope is tied; they then let him go into the water to spend himself, and afterwards drawing him out, run a pole into his mouth, and, jumping on his back, tie his jaws together."

Now, Mr. Waterton and his Indians having secured a monster of the Essequibo, by a baited hook fastened to a long rope, "they pulled the cayman," as he describes, "within two yards of me; I saw he was in a state of fear and perturbation, I instantly dropped the mast, sprung up, and jumped on his back, turning half round as I vaulted, so that I gained my seat with my face in a right position. I immediately seized his fore-legs, and by main force twisted them on his back; thus they served me for a bridle."

Herodotus relates a different way of catching this animal on the Nile.

"When they have fixed a piece of swine's flesh on a hook, they cast it into the middle of the river; and on the bank they have a live pig, which they beat. The crocodile, hearing the squeaking, goes to the noise; and having seized the flesh, devours it: they then pull him; and when they have dragged him on shore, they first of all fill his eyes with mud; and having done this, he is very easily despatched."

Tab. 87, of Johannes Stradaen's *Huntings*, represents the manner of taking these beasts, as described by Herodotus, and the lines below it are (translated):—

"The crocodile of the Nile is taken with a hook baited with a dead pig. The reptile, allured to the shore by the squeaking of a live pig, devours bait and hook, and is overwhelmed with mud and sand."

Although a ride on the back of a crocodile is not likely ever to become very fashionable, as a morning's exercise or amusement, even in this age of the "march of intellect," yet it is seen, from the above authorities, that it really is, and long has been, adopted in the process of killing these monsters of the deep.—MAGAZINE OF NAT. HIST.

of generation; but the most probable opinion is, that this musky substance is amassed in glands under the legs and arms. From whatsoever part of the body this odour proceeds, it is very strong and powerful, tincturing the flesh of the whole body with its taste and smell. The crocodile's flesh is at best very bad, tough eating; but unless the musk-bags be separated it is insupportable. The negroes themselves cannot well digest the flesh; but then, a crocodile's egg is to them the most delicate morsel in the world. Even savages exhibit their epicures as well as we; and one of true taste will spare neither pains nor danger to furnish himself with his favourite repast. For this reason, he often watches the places where the female comes to lay her eggs, and upon her retiring seizes the booty.

All crocodiles breed near fresh waters; and though they are sometimes found in the sea, yet that may be considered rather as a place of excursion than abode. They produce their young by eggs, as was said above: and for this purpose the female when she comes to lay, chooses a place by the side of a river, or some fresh-water lake, to deposit her brood in. She always pitches upon an extensive, sandy shore, where she may dig a hole without danger of detection from the ground being fresh turned up. The shore must also be gentle and shelving to the water, for the greater convenience of the animal's going and returning; and a convenient place must be found near the edge of the stream, that the young may have a shorter way to go. When all these requisites are adjusted, the animal is seen cautiously stealing up on shore to deposit her burthen. The presence of a man, a beast, or even a bird, is sufficient to deter her at that time; and if she perceives any creature looking on, she infallibly returns. If, however, nothing appears, she then goes to work, scratching up the sand with her fore-paws, and making a hole pretty deep in the shore. There she deposits from eighty to a hundred eggs, of the size of a tennis-ball, and of the same figure, covered with a tough white skin like parchment. She takes above an hour to perform this task; and then covering up the place so artfully that it can scarcely be perceived, she goes back to return again the next day. Upon her return, with the same precaution as before, she lays about the same number of eggs; and the day following also a like number. Thus having deposited her whole quantity, and having covered them close up in the sand, they are soon vivified by the heat of the sun; and at the end of thirty days, the young ones begin to break open the shell. At this time the female is instinctively taught that her young ones want relief; and she goes up on land to scratch away the sand and set them free. Her brood quickly avail themselves of their liberty; a part run unguided to the water; another part ascend the back of the female, and are carried thither in greater safety. But the moment they arrive at the water, all natural connexion is at an end: when the female has introduced her young to their natural element, not only she, but the male, become among the number of their most formidable enemies, and devour as many of them as they can. The whole brood scatters into different parts at the bottom; by far the greatest number are destroyed; and the rest find safety in their agility or minuteness.

But it is not the crocodile alone that is thus found to thin their numbers; the eggs of this animal are not only a delicious feast to the savage, but are eagerly sought after by every beast and bird of prey. The ichneumon was erected into a deity among the ancients for its success in destroying the eggs of these monsters: at present that species of the vulture called the gallinazo is their most prevailing enemy. All along the banks of great rivers, for thousands of miles the crocodile is seen to propagate in numbers that would soon over-run the earth but for the vulture, that seems appointed by Providence to abridge its fecundity. These birds are ever found in greatest numbers where the crocodile is most numerous; and hiding themselves within the thick branches of the trees that shade the banks of the river, they watch the female in silence, and permit her to lay all her eggs without interruption. Then when she has retired, they encourage each other with cries to the spoil; and flocking all together upon the hidden treasure, tear up the eggs, and devour them in a much quicker time than they were deposited. Nor are they less diligent in attending the female while she is carrying her young to the water; for if any one of them happens to drop by the way, it is sure to receive no mercy.

Such is the extraordinary account given us by late travellers of the propagation of this animal; an account adopted by Linnæus and the most learned naturalists of the age. (*g*) Yet, if one might argue from the general analogy of nature, the crocodile's devouring her own young when she gets to the water seems doubtful. This may be a story raised from the general idea of this animal's rapacious cruelty; when, in fact, the crocodile only seems more cruel than other animals because it has more power to do mischief. It is probable that it is not more divested of parental tenderness than other creatures; and I am the more led to think so from the peculiar formation of one of the crocodile kind. This is called the open bellied crocodile, and is furnished with a false belly like the opossum, where the young creep out and in as their dangers or necessities require. The crocodile thus furnished at least cannot be said to be an enemy to her own young, since she thus gives them more than parental protection. It is probable also that this open bellied crocodile is viviparous, and fosters her young that are prematurely excluded in this second womb, until they come to proper maturity.

How long the crocodile lives we are not certainly informed; if we may believe Aristotle, it lives the age of a man; but the ancients so much amused themselves in inventing fables concerning this animal, that even truth from them is suspicious. What we know for certain from the ancients is, that among the various animals that were produced to fight in the amphitheatre at Rome, the combat of the crocodile was not wanting. (*g*) Marcus Scaurus produced them living in his unrivalled exhibitions; and the Romans considered him as the best citizen, because he furnished them with the most expensive entertainments. But entertainment at that corrupt time was their only occupation.*

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* THE SERVICES WHICH THE LITTLE BIRD CALLED TROCHILOS RENDERS TO THE CROCODILE.—On the 28th of January, 1828, M. Geoffroy St-Hilaire communicated to the Academy of Sciences at Paris, a paper upon two species of animals called Trochilos and Bdella by Herodotus The author began by announcing that his memoir was, properly speaking, only a commentary on a short passage from Herodotus. "When the crocodile," says this great historian, "feeds in the Nile, the inside of his mouth is always covered with bdella (a term which the translators have rendered by that of *leech*) All birds *except one* fly from the crocodile, but this one bird, the trochilos, on the contrary, flies towards him with the greatest eagerness, and renders him a very great service; for every time that the crocodile comes to the land to sleep, and when he lies stretched out with his jaws open, the trochilos enters and establishes itself in his mouth, and frees him from the bdella which he finds there. The crocodile is grateful, and never does any harm to the little bird who performs for him this good office."

This passage is one of those which has most exercised the sagacity of commentators. Some have looked upon it merely as a pleasant story, while others, in order to justify Herodotus, have pushed their zeal so far as to create an animal which could impose upon the crocodile, and be capable of all the actions attributed to the trochilos. M Geoffroy St-Hilaire proposes to show that Herodotus has been defended as awkwardly as he has been attacked unjustly. During his long residence in Egypt, M Geoffroy had repeated occasion to ascertain that the story of Herodotus, though correct in substance, was inexact only in some particular details. It is perfectly true that a little bird does exist, which flies incessantly from place to place, searching everywhere, even in the crocodile's mouth, for the insects which form the principal part of its nourishment. This bird is seen everywhere on the banks of the Nile; and Geoffroy having succeeded in procuring one, recognised it as belonging to a species already described by Hasselquist, under the name of *Charadrius Ægyptius*. There is in France a bird very like it, if not precisely the same, namely, the *small ringed plover*. With his slender beak this bird can take nothing but the smallest insects, the spawn of fish, or those molecular debris, those fragments of animal *detritus* which the action of the waters throws incessantly upon the banks.

If the trochilos is in reality the little plover, the animals described by Herodotus under the name of bdella cannot be *leeches*, (besides, leeches do not exist in the running waters of the Nile,) but a very small insect of that species which swarm in those damp and warm regions, known by the name of *gnats* in

(*g*) Ulloa.

(*g*) Plin. lib. viii. c. 26.

CHAP. VI.

THE SALAMANDER.

The ancients have described a lizard that is bred from heat, that lives in the flames, and feeds upon fire as its proper nourishment. As they saw every other element, the air, the earth, and water, inhabited, fancy was set to work to find or make an inhabitant in fire; and thus to people every part of nature. It will be needless to say that there is no such animal existing; and that, of all others, the modern salamander has the smallest affinity to such an abode.

Not only this, but many others of the lizard tribe are said to have venom; but it were to be wished that mankind, for their own happiness, would examine into the foundation of this reproach. By that means many of them, that are now shunned and detested, might be found inoffensive; their figure, instead of exciting either horror or disgust, would then only tend to animate the general scene of nature; and speculation might examine their manners in confidence and security. Certain it is, that all of the lizard kind with which we are acquainted in this country, are perfectly harmless; and it is equally true that, for a long time, till our prejudices were removed, we considered not only the newt, but the snake and the blind-worm, as fraught with the most destructive poison. At present we have got over these prejudices; and, it is probable, that, if other nations made the same efforts for information, it would be found, that the malignity of most, if not all, of the lizard tribe, was only in the imagination.

With respect to the salamander, the whole tribe, from the moron to the gekko, are said to be venomous to the last degree; yet, when experiments have been tried, no arts, no provocations, could excite these animals to the rage of biting. They seem timid and inoffensive, only living upon worms and insects; quite destitute of fangs, like the viper; their teeth are so very small, that they are hardly able to inflict a wound.

The salamander best known in Europe, is from eight to eleven inches long, usually black, spotted with yellow; and when taken in the hand feeling cold to a great degree. There are several kinds. Our black water newt is reckoned among the number. The idle report of its being inconsumable in fire, has caused many of these poor animals to be burnt; but we cannot say as philosophical martyrs; since scarce any philosopher could think it necessary to make the experiment. When thrown into the fire, the animal is seen to burst with the heat of its situation, and to eject its fluids. We are gravely told in the Philosophical Transactions, that this is a method the animal takes to extinguish the flames.

Europe, and of *maringouins* in America. Myriads of these insects dance upon the borders of the Nile, and when the crocodile reposes on the land he is attacked by their innumerable swarms. His mouth is not so hermetically sealed as to prevent them from introducing themselves; and they penetrate in such vast numbers, that the inner surface of his palate, which is naturally of a bright yellow, appears to be covered with a brownish black crust. All these sucking insects drive their stings into the orifice of the glands, which are numerous in the mouth of the crocodile. It is then that the little plover, who follows him everywhere, comes to his succour, and delivers him from his troublesome enemies;—and that without any danger to himself, for the crocodile is always careful when he is going to shut his mouth to make some motion which warns the little bird to fly away. At St Domingo there is a crocodile which so nearly resembles those of Egypt, that M. Geoffroy could not distinguish them without great difficulty. This crocodile is also attacked by the *gnats*, from which he would have no means of delivering himself, (his tongue, like that of the crocodile of the Nile, being fixed) if a bird of a particular species did not give him the same assistance that the crocodile of the Nile receives from the little plover. These facts explain the passage in Herodotus, and demonstrate that the animal which is there called *bdella* is not a *leech*, but a flying insect, similar to our *gnat*.

When examined internally, the salamander exhibits little different from other animals of the lizard kind. It is furnished with lungs that sometimes serve for the offices of breathing; with a heart that has its communications open, so that the animal cannot easily be drowned. The ovary in the female is double the size of what it is in others of this tribe; and the male is furnished with four testiculi instead of two. But what deserves particular notice is the manner of this animal's bringing forth its young alive. (g) "The salamander," says my author, "begins to show itself in spring, and chiefly during heavy rains. When the warm weather returns, it disappears; and never leaves its hole, during either great heats or severe colds, both which it equally fears. When taken in the hand, it appears like a lump of ice; it consequently loves the shade, and is found at the feet of old trees surrounded with brush-wood at the bottom. It is fond of running along new-ploughed grounds; probably to seek for worms, which are its ordinary food. One of these," continues my author, "I took alive some years ago in a ditch that had been lately made. I laid it at the foot of the stairs upon coming home, and there it disgorged from the throat a *worm* three inches long, that lived for an hour after, though wounded as I suppose by the teeth of the animal. I afterwards cut up another of these lizards, and saw not less than fifty young ones, resembling the parent, come from its womb, all alive, and actively running about the room." It were to be wished the author had used another word beside that of *worm;* as we now are in doubt whether he means a real worm, or a young animal of the lizard species: had he been more explicit, and had it appeared that it was a real young lizard, which I take to be his meaning, we might here see a wonder of nature, brought to the proof, which many have asserted, and many have thought proper to deny:—I mean the refuge which the young of the shark, the lizard, and the viper kinds, are said to take, by running down the throat of the parent, and there finding a temporary security. The fact, indeed, seems a little extraordinary; and yet it is so frequently attested by some, and even believed by others, whose authority is respectable, among the number of whom we find Mr. Pennant, that the argument of strangeness must give way to the weight of authority.

They are all amphibious, or at least are found capable of subsisting in either element, when placed there: if those taken from land are put into water, they continue there in seeming health; and, on the contrary, those taken from the water will live upon land. In water, however, they exhibit a greater variety in their appearance; and what is equally wonderful with the rest of their history, during the whole spring and summer this water lizard changes its skin every fourth or fifth day; and during the winter every fifteen days.

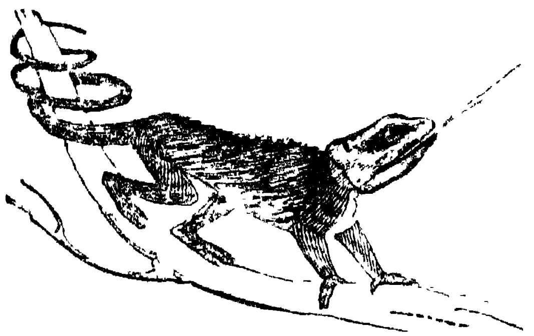
The whole of the lizard kind are also tenacious of life in another respect, and the salamander among the number. They sustain the want of food in a surprising manner. One of them, brought from the Indies, lived nine months, without any other food than what it received from licking a piece of earth on which it was brought over: (g) another was kept by Seba in an empty vial for six months, without any nourishment; and Redi talks of a large one, brought from Africa, that lived for eight months, without taking any nourishment whatever. Indeed, as many of this kind, both salamanders and lizards, are torpid, or nearly so, during the winter, the loss of their appetite for so long a time is the less surprising.

(g) Acta Hafniensia. ann. 1676. Observ. 11. Memoires de l'Academie Royale des Sciences tom. iii. part 3. p. 80.

(g) Phil. Trans ann. 1661. N. 21, art 7

CHAP. VII.

THE CHAMELEON, IGUANA, AND LIZARDS OF DIFFERENT KINDS.



(The Chameleon.)

It were to be wished that animals could be so classed, that by the very mentioning their rank, we should receive some insight into their history. This I have endeavoured in most instances; but in the present chapter all method is totally unserviceable. Here distribution gives no general ideas: for some of the animals to be here mentioned produce by eggs, some by spawn, and some are viviparous. The peculiar manner of propagating in each, is very indistinctly known. The Iguana and the Chameleon, we know bring forth eggs; some others also produce in the same manner: but of the rest, which naturalists make amount to above fifty, we have but very indistinct information.

In the former divisions of this tribe, we had to observe upon animals, formidable from their size, or disgusting from their frog like head and appearance; in the present division, all the animals are either beautiful to the eye, or grateful to the appetite. The lizards, properly so called, are beautifully painted and mottled; their frolicsome agility is amusing to those who are familiar with their appearance; and the great affection which some of them show to man, should, in some measure, be repaid with kindness. Others, such as the iguana, though not possessed of beauty, are very serviceable, furnishing one of the most luxurious feasts the tropical climates can boast of.

The iguana, which deserves our notice, is about five feet long, and the body about as thick as one's thigh: the skin is covered with small scales, like those of a serpent; and the back is furnished with a row of prickles, that stand up, like the teeth of a saw: the eyes seem to be but half opened, except when the animal is angry, and then they appear large and sparkling: both the jaws are full of very sharp teeth, and the bite is dangerous, though not venomous, for it never lets loose till it is killed. The male has a skin hanging under his throat, which reaches down to his breast; and, when displeased, he puffs it up like a bladder: he is one-third larger and stronger than the female; though the strength of either avails them little towards their defence. The males are ash-coloured, and the females are green.

The flesh of these may be considered as the greatest delicacy of Africa and America; and the sportsmen of those climates go out to hunt the iguana, as we do in pursuit of the pheasant or the hare. In the beginning of the season, when the great floods of the tropical climates are past away, and vegetation starts into universal verdure, the sportsmen are seen, with a noose and a stick, wandering along the sides of the rivers, to take the iguana. This animal, though apparently formed for combat, is the most harmless creature of all the forest; it lives among the trees, or sports in the water, without ever offering to offend: there, having fed upon the flowers of the mahot, and the leaves of the mapou, that grow along the banks of the stream, it goes to repose upon the branches of the trees that hang over the water. Upon land the animal is swift of foot; but when once in possession of a tree, it seems conscious of the security of its situation, and never offers to stir. There the sportsman easily finds it, and as easily fastens his noose round its neck: if the head be placed in such a manner that the noose cannot readily be fastened, by hitting the animal a blow on the nose with the stick, it lifts the head, and offers it in some measure to the noose. In this manner, and also by the tail, the iguana is dragged from the trees, and killed by repeated blows on the head.

The Chameleon is a very different animal; and as the iguana satisfies the appetites of the epicure, this is rather the feast of the philosopher. Like the crocodile, this little animal proceeds from an egg; and it also nearly resembles that formidable creature in form; but it differs widely in its size and its appetites; being not above eleven inches long, and delighting to sit upon trees, being afraid of serpents, from which it is unable to escape on the ground.[*]

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[*] Account of the Chameleon.—During his visit to the East, Le Bruyn purchased several chameleons, for the purpose of preserving them alive, and making observations on their nature and manners; but the most interesting account of this curious animal, is that furnished by the enterprising and lamented Belzoni, which we transcribe. There are three species of chameleons, whose colours are peculiar to themselves; for instance, the commonest sort are those which are generally green: that is to say, the body all green, and, when content, beautifully marked on each side regularly on the green with black and yellow, not in a confused manner, but as if drawn. This kind is in great plenty, and never have any other colour, except a light green when they sleep, and when ill, a very pale yellow. Out of near forty I had the first year when I was in Nubia, I had but one, and that a very small one, of the second sort, which had red marks. One chameleon lived with me eight months, and most of that time I had it fixed to the button of my coat: it used to rest on my shoulder, or on my head. I have observed, when I have kept it shut up in a room for some time, that on bringing it out in the air, it would begin drawing the air in; and on putting it on some marjoram, it has had a wonderful effect on it immediately: its colour became most brilliant. I believe it will puzzle a good many to say what cause it proceeds from. If they did not change when shut up in a house, but only on taking them into a garden, it might be supposed the change of the colours was in consequence of the smell of the plants; but when in a house, if it is watched, it will be seen to change every ten minutes: some moments a plain green, at others, all its beautiful colours will come out, and when in a passion, it becomes a deep black, and will swell itself up like a balloon; and from being one of the most beautiful animals, it becomes one of the most ugly. It is true they are extremely fond of the fresh air; and, on taking them to a window where there is nothing to be seen, it is easy to observe the pleasure they certainly take in it: they begin to gulp down the air, and their colour becomes brighter. I think it proceeds, in a great degree, from the temper they are in: a little thing will put them in a bad humour. If, in crossing a table, for instance, you stop them, and attempt to turn them another road, they will not stir, and are extremely obstinate; on opening the mouth at them, it will set them in a passion: they begin to arm themselves, by swelling and turning black, and will sometimes hiss a little, but not much.

The third I brought from Jerusalem, was the most singular of all the chameleons I ever had: its temper, if it can be so called, was extremely sagacious and cunning. This one was not of the order of the green kind, but a disagreeable drab, and it never once varied in its colour for two months. On my arrival at Cairo, I used to let it crawl about the room, on the furniture. Sometimes it would get down, if it could, and hide itself away from me, but in a place where it could see me; and sometimes, on my leaving the room, and on entering it, would draw itself so thin as to make itself nearly on a level with whatever it might be on, so that I might not see it. It had often deceived me so. One day, having missed it for some time, I concluded it was hid about the room; after looking for it in vain, I thought it had got out of the room, and made its escape. In the course of the evening, after the candle was lighted, I went to a basket that had a handle across it: I saw my chameleon, but its colour entirely changed, and different to any I ever had seen before; the whole body, head and tail, a brown, with black spots, and beautiful, deep orange-coloured spots round the black. I certainly was much gratified. On being disturbed, its colours vanished, unlike the others; but after this, I used to observe it the first thing in the morning, when it would have the same colours. Their chief food was flies: the fly does not die immediately on being swallowed, for, on taking the chameleon up in my hands, it was easy to feel the fly buzzing, chiefly on account of the air they draw in their inside: they swell much, and particularly when they want to fling themselves off a great height, by filling themselves up like a balloon. On falling, they get no hurt, except on the mouth, which they bruise a little, as that comes first to the ground. Sometimes they will not drink for three or four days, and when they begin, they

The head of a large chameleon is almost two inches long; and from thence to the beginning of the tail, four and a half: the tail is five inches long; and the feet two and a half: the thickness of the body is different at different times; for sometimes, from the back to the belly, it is two inches, and sometimes but one; for it can blow itself up, and contract itself, at pleasure. This swelling and contraction is not only of the back and belly, but of the legs and tail.

These different tumours do not proceed from a dilatation of the breast in breathing, which rises and falls by turns; but are very irregular, and seem adopted merely from caprice. The chameleon is often seen, as it were, blown up for two hours together; and then it continues growing less and less insensibly; for the dilatation is always more quick and visible than the contraction. In this last state the animal appears extremely lean; the spine of the back seems sharp, and all the ribs may be counted; likewise the tendons of the legs and arms may be seen very distinctly.

This method of puffing itself up, is similar to that in pigeons, whose crops are sometimes greatly distended with air. The chameleon has a power of driving the air it breathes over every part of the body: however, it only gets between the skin and the muscles; for the muscles themselves are never swollen. The skin is very cold to the touch; and though the animal seems so lean, there is no feeling the beating of the heart. The surface of the skin is unequal, and has a grain not unlike shagreen, but very soft, because each eminence is as smooth as if it were polished. Some of these little protuberances are as large as a pin's head, on the arms, legs, belly, and tail; but on the shoulders and head they are of an oval figure, and a little larger: those under the throat are ranged in the form of a chaplet, from the lower lip to the breast. The colour of all these eminences, when the chameleon is at rest in a shady place, is of a bluish grey, and the space between is of a pale red and yellow.

But when the animal is removed into the sun, then comes the wonderful part of its history. At first it appears to suffer no change of colour, its greyish spots still continuing the same: but the whole surface soon seems to imbibe the rays of light; and the simple colouring of the body changes into a variety of beautiful hues. Wherever the light comes upon the body, it is of a tawny brown; but that part of the skin on which the sun does not shine, changes into several brighter colours, pale yellow, or vivid crimson; which form spots of the size of half one's finger: some of these descend from the spine half way down the back; and others appear on the sides, arms, and tail. When the sun has done shining, the original grey colour returns by degrees, and covers all the body. Sometimes the animal becomes all over spotted with brown spots, of a greenish cast. When it is wrapped up in a white linen cloth for two or three minutes, the natural colour becomes much lighter: but not quite white, as some authors have pretended: however, from hence it must not be concluded that the chameleon assumes the colour of the objects which it approaches; this is entirely an error, and probably has taken its rise from the continual changes it appears to undergo.*

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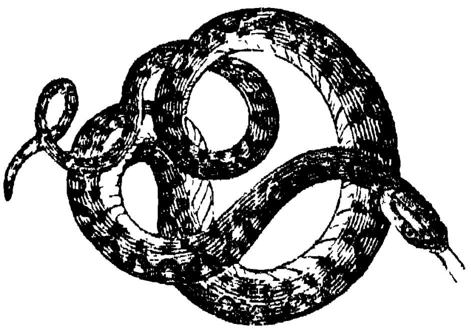
are about half an hour drinking. I have held a glass in one hand, while the chameleon rested its two fore paws on the edge of it, the two hind ones resting on my other hand. It stood upright while drinking, holding its head up like a fowl. By flinging its tongue out of its mouth, the length of its body, and instantaneously catching the fly, it would go back like a spring. They will drink mutton broth. "When in Italy, a gentleman, a professor of natural history, had two sent him from the coast of Barbary, but they did not live long; he dissected them, and his idea on the change of colour is, that he found they had four skins extremely fine, which occasioned the different colours. It may be so; but of this I am positively certain, whatever it may proceed from, they have then different colours peculiar, distinct, and independent of each other, and of themselves." He adds, in another place, that the chameleons are very inveterate towards their own kind, biting off each others' tails and legs, it shut up in the same cage.

* THE CHAMELEON'S ANTIPATHY TO BLACK. —Whatever may be the cause, the fact seems to be certain, that the chameleon has an antipathy to things of a black colour. One, which Forbes kept, uniformly avoided a black board which was hung up in the chamber; and, what is most remarkable, when it was forcibly

To this class of lizards we may refer the Dragon, a most terrible animal, but most probably not of Nature's formation. Of this death-dealing creature all people have read; and the most barbarous countries, to this day, paint it to the imagination in all its terrors, and fear to meet it in every forest. It is not enough that Nature has furnished those countries with poisons of various malignity; with serpents forty feet long; with elephants, lions, and tigers, to make their situation really dangerous; the capricious imagination is set at work to call up new terrors; and scarce a savage is found that does not talk of winged serpents of immoderate length, flying away with the camel or the rhinoceros, or destroying mankind by a single glare. Happily, however, such ravagers are no where found to exist at present; and the whole race of dragons is dwindled down to the Flying Lizard, a little harmless creature, that only preys upon insects, and even seems to embellish the forest with its beauty

CHAP. VIII.

SERPENTS IN GENERAL.



We now come to a tribe that not only their deformity, their venom, their ready malignity, but also our prejudices, and our very religion, have taught us to detest. The serpent has from the beginning been the enemy of man; and it has hitherto continued to terrify and annoy him, notwithstanding all the arts which have been practised to destroy it.

But though we have reduced these noxious reptiles, we have been incapable of wholly removing them: in many parts of the world they still rage with all their ancient malignity. Nature seems to have placed them as centinels to deter mankind from spreading too widely, and from seeking new abodes till they have thoroughly cultivated those at home. In the warm countries that lie within the tropic, as well as in the cold regions of the north, where the inhabitants are few, the serpents propagate in equal proportion. But of all countries those regions have them in the greatest abundance where the fields are unpeopled and fertile, and where the climate supplies warmth and humidity. All along the swampy banks of the river Niger, or Oronoko, where the sun is hot, the forests thick, and the men but few, the serpents cling among the branches of the trees in infinite numbers, and carry on an unceasing war against all other animals in their vicinity.

We are not to reject as wholly fabulous, the accounts left us by the ancients of the terrible devastations committed by a single serpent. It is probable, in early times, when the arts were little known, and mankind were but thinly scattered over the earth, that serpents, continuing undisturbed possessors of the forest, grew to an amazing magnitude; and every other tribe of animals fell before them. It then might have happened, that serpents reigned the tyrants of

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brought before the black board, it trembled violently, and assumed a black colour.—Oriental Memoirs.

It may be something of the same kind which makes bulls and turkey-cocks dislike the colour of scarlet, a fact of which there can be no doubt.—Magazine of Natural History.

a district for centuries together. To animals of this kind, grown by time and rapacity to a hundred, or a hundred and fifty feet in length, the lion, the tiger, and even the elephant itself, were but feeble opponents. The dreadful monster spread desolation round him; every creature that had life was devoured, or fled to a distance. That horrible *fœtor* which even the commonest and the most harmless snakes are still found to diffuse, might, in these larger ones, become too powerful for any living being to withstand; and while they preyed without distinction, they might thus also have poisoned the atmosphere around them.*

But happily for us, we are placed at such a distance as to take a view of this tribe, without fearing for our safety; we can survey their impotent malignity with the same delight with which the poet describes the terrors of a dead monster.

Nequeant expleri corda tuendo
Terribiles oculos villosaque setis pectore.

To us their slender form, their undulating motion, their vivid colouring, their horrid stench, their forky tongue, and their envenomed fangs, are totally harmless; and in this country their uses even serve to counterbalance the mischief they sometimes occasion.

If we take a survey of serpents in general, they have marks by which they are distinguished from all the rest of animated nature. They have the length and the suppleness of the eel, but want fins to swim with; they have the scaly covering and pointed tail of the lizard, but they want legs to walk with; they have the crawling motion of the worm, but, unlike that animal, they have lungs to breathe with: like all the reptile kind, they are resentful when offended; and Nature has supplied them with terrible arms to revenge every injury.

Though they are possessed of very different degrees of malignity, yet they are all formidable to man, and have a strong similitude of form to each other. With respect to their conformation, all serpents have a very wide mouth, in proportion to the size of the head; and what is very extraordinary, they can gape and swallow the head of another animal which is three times as big as their own. I have seen a toad taken out of the belly of a snake, at Lord Spencer's, near London, the body of which was thrice the diameter of the animal that swallowed it. However, it is no way surprising that the skin of the snake should stretch to receive so large a morsel; the wonder seems how the jaws could take it in. To explain this, it must be observed that the jaws of this animal do not open as ours, in the manner of a pair of hinges, where bones are applied to bones, and play upon one another; on the contrary, the serpent's jaws are held together at the roots by a stretching muscular skin; by which means they open as widely as the animal chooses to stretch them, and admit of a prey much thicker than the snake's own body. The throat, like stretching leather, dilates to admit the morsel; the stomach receives it in part; and the rest remains in the gullet, till putrefaction and the juices of the serpent's body unite to dissolve it.

As to the teeth, I will talk more of them when I come to treat of the viper's poison; it will be sufficient here to observe, that some serpents have fangs, or canine teeth, and others are without them. The teeth in all are crooked and hollow; and, by a peculiar contrivance, are capable of being erected or depressed at pleasure.

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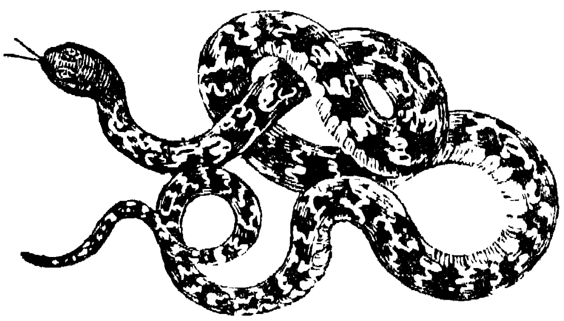
* **Serpents of Old**—We are told, that while Regulus led his army along the banks of the river Bagrada, in Africa, an enormous serpent disputed his passage over. We are assured by Pliny, who says that he himself saw the skin, that it was a hundred and twenty feet long, and that it had destroyed many of the army. At last, however, the battering engines were brought out against it; and these assailing it at a distance, it was soon destroyed. Its spoils were carried to Rome, and the general was decreed an ovation for his success. There are, perhaps, few facts better ascertained in history than this: an ovation was a remarkable honour; and was given only for some signal exploit, that did not deserve a triumph: no historian would offer to invent that part of the story at least, without being subject to the most shameful detection. The skin was kept for several years after in the capitol; and Pliny says, he saw it there: now, though Pliny was a credulous writer, he was by no means a *false* one; and whatever he says he has seen, we may very safely rely on. At present, indeed, such ravages from serpents are scarce seen in any part of the world; not but that in Africa and America, some of them are powerful enough to brave the assaults of men to this day.

The eyes of all serpents are small, if compared to the length of the body; and though differently coloured in different kinds, yet the appearance of all is malign and heavy; and from their known qualities, they strike the imagination with the idea of a creature meditating mischief. In some, the upper eyelid is wanting, and the serpent winks only with that below; in others, the animal has a nictitating membrane, or skin, resembling that which is found in birds, which keeps the eye clean, and preserves the sight. The substance of the eye in all is hard and horny; the chrystalline humour occupying a great part of the globe.

The holes for hearing are very visible in all: but there are no conduits for smelling; though it is probable that some of them enjoy that sense in tolerable perfection.

The tongue in all these animals is long and forky. It is composed of two long fleshy substances, which terminate in sharp points, and are very pliable. At the root it is connected very strongly to the neck by two tendons, that give it a variety of play. Some of the viper kind have tongues a fifth part of the length of their bodies; they are continually darting them out, but they are entirely harmless, and only terrify those who are ignorant of the real situation of their poison.


(The Fatal Viper.)

If from the jaws we go on to the gullet, we shall find it very wide for the animal's size, and capable of being distended to a great degree; at the bottom of this lies the stomach, which is not so capacious, and receives only a part of the prey, while the rest continues in the gullet for digestion. When the substance in the stomach is dissolved into chyle, it passes into the intestines, and from thence goes to nourishment, or to be excluded by the vent.

Like most other animals, serpents are furnished with lungs, which I suppose are serviceable in breathing, though we cannot perceive the manner in which this operation is performed; for though serpents are often seen apparently to draw in their breath, yet we cannot find the smallest signs of their ever respiring it again. Their lungs, however, are long and large, and doubtless are necessary to promote their languid circulation. The heart is formed as in the tortoise, the frog, and the lizard kinds, so as to work without the assistance of the lungs. It is single, the greatest part of the blood flowing from the great vain to the great artery by the shortest course. By this contrivance of Nature we easily gather two consequences; that snakes are amphibious, being equally capable of living on land and in the water; and, that also they are torpid in winter, like the bat, the lizard, and other animals formed in the same manner.

The vent in these animals serves for the emission of the urine and the fæces, and for the purposes of generation. The instrument of generation in the male is double, being forked like the tongue; the ovaries in the female are double also; and the aperture is very large, in order to receive the double instrument of the male. They copulate in their retreats; and it is said by the ancients, that in this situation they appear like one serpent with two heads; but how far this remark is founded in truth, I do not find any of the moderns that can resolve me.

As the body of this animal is long, slender, and capable of bending in every direction, the number of joints in the backbone are numerous beyond what one would imagine. In the generality of quadrupeds they amount to not above thirty or forty; in the serpent kind they amount to a hundred and forty-five from the head to the vent, and twenty-five more from that to the tail. (g) The number

(g) Vide Charat. Anatom.

of these joints must give the backbone a surprising degree of pliancy; but this is still increased by the manner in which each of these joints is locked into the other. In man and quadrupeds, the flat surfaces of the bones are laid one against the other, and bound tight by sinews; but in serpents the bones play one within the other like ball and socket, so that they have full motion upon each other in every direction.(*g*) Thus, if a man were to form a machine composed of so many joints as are found in the back of a serpent, he would find it no easy matter to give it such strength and pliancy at the same time. The chain of a watch is but a bungling piece of workmanship in comparison.

Though the number of joints in the backbone is great, yet that of the ribs is still greater; for, from the head to the vent, there are two ribs to every joint, which make their number two hundred and ninety in all. These ribs are furnished with muscles, four in number; which being inserted into the head, run along to the end of the tail, and give the animal great strength and agility in all its motions.

The skin also contributes to its motions, being composed of a number of scales united to each other by a transparent membrane, which grows harder as it grows older, until the animal changes, which is generally done twice a year. This cover then bursts near the head, and the serpent creeps from it, by an undulatory motion, in a new skin, much more vivid than the former. If the old slough be then viewed, every scale will be distinctly seen, like a piece of network, and will be found greatest where the part of the body they covered was largest.

There is much geometrical neatness in the disposal of the serpent's scales, for assisting the animal's sinuous motion. As the edges of the foremost scales lie over the ends of their following scales, so those edges, when the scales are erected, which the animal has a power of doing in a small degree, catch in the ground, like the nails in the wheel of a chariot, and so promote and facilitate the animal's progressive motion. The erecting these scales is by means of a multitude of distinct muscles, with which each is supplied, and one end of which is tacked each to the middle of the foregoing.

In some of the serpent kind there is the exactest symmetry in these scales; in others they are disposed more irregularly. In some there are larger scales on the belly, and often answering to the number of ribs: in others, however, the animal is without them. Upon this slight difference, Linnæus has founded his distinctions of the various classes of the serpent tribe. Human curiosity, however, and even human interest, seem to plead for a very different method of distribution. It is not the number of scales on a formidable animal's belly, nor their magnitude or variety, that any way excite our concern. The first question that every man will naturally ask, when he hears of a snake, is, whether it be large? the second, whether it be venomous? In other words, the strongest lines in the animal's history are those that first excite our attention; and these it is every historian's business to display.*

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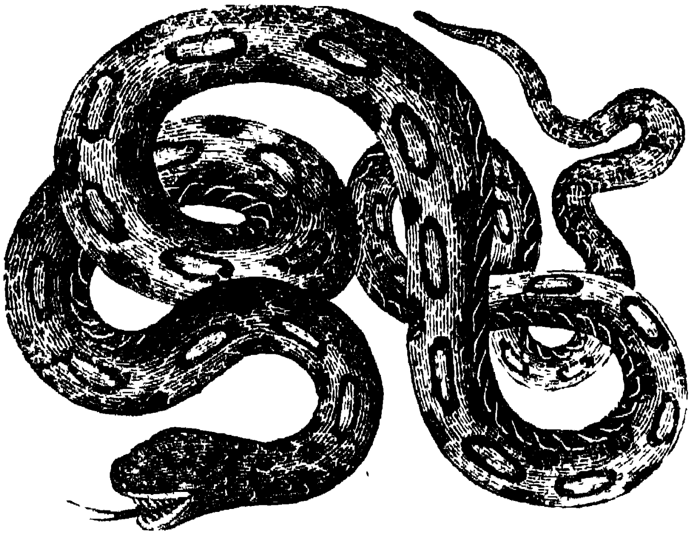
* **Comparison of Serpents.**—When we come to compare serpents with each other, the first great distinction appears in their size; no other tribe of animals differing so widely in this particular. What, for instance, can be so remotely separated as the Great Liboya of Surinam, that grows to thirty-six feet long; and the Little Serpent, at the Cape of Good Hope and the north of the river Senegal, that is not above three inches, and covers whole sandy deserts with its multitudes! This tribe of animals, like that of fishes, seems to have no bounds put to their growth: their bones are in a great measure cartilaginous, and they are consequently capable of great extension, the older, therefore, a serpent becomes, the larger it grows; and as they seem to live to a great age, they arrive at an enormous size.

Leguat assures us, that he saw one in Java that was fifty feet long. Carli mentions their growing to above forty feet; and we have now the skin of one in the Museum that measures thirty-two. Mr. Wentworth, who had large concerns in the Brebices, in America, assures me, that, in that country, they grow to an enormous length. He one day sent out a soldier, with an Indian, to kill wild fowl for the table; and they accordingly went some miles from the fort: in pursuing their

(*g*) Derham, p. 396.

The last distinction, then, that I shall mention, but the most material among serpents is, that some are venomous and some inoffensive. If we consider the poison of serpents as it relates to man, there is no doubt but that it is a scourge and an affliction. The various calamities that the poison of serpents is capable

game, the Indian, who generally marched before, beginning to tire went to rest himself upon the fallen trunk of a tree, as he supposed it to be; but when he was just going to sit down, the enormous monster began to move, and the poor savage perceiving that he had approached a Liboya, the greatest of all the serpent kind, dropped down in an agony. The soldier, who perceived at some distance what had happened, levelled at the serpent's head, and, by a lucky aim, shot it dead: however, he continued his fire until he was assured that the animal was killed; and then going up to rescue his companion, who was fallen motionless by its side, he, to his astonishment, found him dead likewise, being killed by the fright.



Upon his return to the fort, and telling what had happened, Mr. Wentworth ordered the animal to be brought up, when it was measured, and found to be thirty-six feet long. He had the skin stuffed, and then sent to Europe, as a present to the Prince of Orange, in whose cabinet it is now to be seen at the Hague; but the skin has shrunk, by drying, two or three feet.

In the East Indies they grow also to an enormous size; particularly in the Island of Java, where, we are assured, that one of them will destroy and devour a buffalo. In a letter, printed in the German Ephemerides, we have an-account of a combat between an enormous serpent and a buffalo, by a person who assures us that he was himself a spectator. The serpent had for some time been waiting near the brink of a pool, in expectation of its prey; when a buffalo was the first that offered. Having darted upon the affrighted animal, it instantly began to wrap it round with its voluminous twistings; and at every twist the bones of the buffalo were heard to crack almost as loud as the report of a cannon. It was in vain that the poor animal struggled and bellowed; its enormous enemy entwined it too closely to get free; till at length, all its bones being mashed to pieces, like those of a malefactor on the wheel, and the whole body reduced to one uniform mass, the serpent untwined its folds to swallow its prey at leisure. To prepare for this, and in order to make the body slip down the throat more glibly, it was seen to lick the whole body over, and thus cover it with its mucus. It then began to swallow it at that end that offered least resistance; while its length of body was dilated to receive its prey, and thus took in at once a morsel that was three times its own thickness. We are assured by travellers, that these animals are often found with the body of a stag in their gullet, while the horns, which they are unable to swallow, keep sticking out at their mouths.

But it is happy for mankind that the rapacity of these frightful creatures is often their punishment; for whenever any of the serpent kind have gorged themselves in this manner, whenever their body is seen particularly distended with food, they then become torpid, and may be approached and destroyed with safety. Patient of hunger to a surprising degree, whenever they seize and swallow their prey, they seem, like surfeited gluttons, unwieldy, stupid, helpless, and sleepy: they at that time seek some retreat, where they may lurk for several days together, and digest their meal in safety: the smallest effort at that time is capable of destroying them; they can scarce make any resistance: and they are equally unqualified for flight or opposition: that is the happy opportunity of attacking them with success; at that time the naked Indian himself does not fear to assail them. But it is otherwise when this sleepy interval of digestion is over; they then issue, with famished appetites, from their retreats, and with accumulated terrors, while every animal of the forest flies before them.

Boa Constrictor.—The length of a brood of Boa Constrictors when they were hatched of producing, are not only inflicted by the animal itself, but by men more mischievous even than serpents, who prepare their venom to destroy each other. With this the savages poison their arms, and also prepare their revengeful potions. The ancients were known to preserve it for the purposes of suicide; and even among semi-barbarous countries at this day, the venom of snakes is used as a philtre.

But, though the poison be justly terrible to us, it has been given to very good purposes for the animal's own proper support and defence. Without this, serpents, of all other animals, would be the most exposed and defenceless; without feet for escaping a pursuit; without teeth capable of inflicting a dangerous wound, or without strength for resistance; incapable, from their size, of finding security in very small retreats like the earth-worm, and disgusting all from their deformity, nothing was left for them but a speedy extirpation. But furnished as they are with powerful poison, every rank of animals approach them with dread, and never seize them but at an advantage. Nor is this all the advantage they derive from it. The malignity of a few serves for the protection of all. Though not above a tenth of their number are actually venomous, yet the similitude they all bear to each other excites a general terror of the whole tribe; and the uncertainty of their enemies in which the poison chiefly resides, makes even the most harmless formidable. Thus Providence seems to have acted with double precaution; it has given some of them poison for the general defence of a tribe naturally feeble; but it has thinned the numbers of those which are venomous, lest they should become too powerful for the rest of animated nature.

It is in man that these venomous creatures find the most dangerous enemy. The Psylli of old were famous for charming and destroying serpents. Some moderns pretend to the same art. Casaubon says, that he knew a man who could at any time summon a hundred serpents together, and draw them into the fire. Upon a certain occasion, when one of them bigger than the rest would not be brought in, he only repeated his charm, and it came forward, like the rest, to submit to the flames. Philostratus describes particularly how the Indians charm serpents. "They take a scarlet robe embroidered with golden letters, and spread it before a serpent's hole. The golden letters have a fascinating power; and by looking stedfastly, the serpent's eyes are overcome and laid asleep." These and many other feats have been often practised upon these animals by artful men, who had first prepared the serpents for their exercise, and then exhibited them as adventitiously assembled at their call. In India there is nothing so common as dancing serpents, which are carried about in a broad, flat vessel somewhat resembling a sieve. These erect and put themselves in motion at the word of command. When their keeper sings a slow tune, they seem by their heads to keep time; when he sings a quicker measure, they appear to move more brisk and lively. All animals have a certain degree of docility; and

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was *eighteen* inches long; but we are informed by a letter from our correspondent in India, dated 10th of October, 1826, that they have increased to *thirty-eight* inches, having grown *twenty* inches in fifteen months — BREWSTER'S JOURNAL.

BREATHING-TUBE OF THE BOA.—Several years ago I had an opportunity (the only one in my life) of witnessing the rare sight of a boa feeding. Its prey was a rabbit; and when the little animal was drawn into its mouth, up to the shoulders, it became matter of wonder to me how the reptile supported respiration, for its mouth and nostrils seemed to be completely stopped. Stooping down for the purpose of watching the process of deglutition more closely, my attention was arrested by the appearance of a breathing-tube, about a quarter of an inch in diameter, projecting from the lower jaw, to the extent of an inch or more out of the mouth, as if an elongation of the trachea: it lay close up to the breast of the rabbit, and was, of course, concealed by its body. The keeper of the reptile had never before noticed this singular air-tube, and it was as much a matter of astonishment to him as to myself; but having no kind of familiarity or intimacy with each other, he felt disinclined to allow me to prosecute the investigation any further: indeed, I believe, he feared lest the serpent might receive some injury from being handled. However, I discovered quite sufficient to satisfy my mind that this curious formation was of service to the serpent, by affording it free respiration when its mouth and nostrils were closed by the body of the rabbit.—CORRESPONDENT OF LOUDON'S MAGAZINE OF NATURAL HIST.

we find that serpents themselves can be brought to move and approach at the voice of their master.* From this trick, successfully practised before the ignorant, it is most probable has arisen all the boasted pretensions which some have made to charming of serpents; an art to which the native Americans pretend at this very day. One of Linnæus's pupils, we are told, purchased the secret from an Indian, and then discovered it to his master; but, like all secrets of the kind, it is probable this ended in a few unmeaning words of no efficacy.

Though the generality of mankind regard this formidable race with horror, yet there have been some nations, and there are some at this day, that consider them with veneration and regard. The adoration paid by the ancient Egyptians to a serpent is well known: many of the nations at present along the western coast of Africa retain the same unaccountable veneration. Upon the gold and slave coasts, a stranger, upon entering the cottages of the natives, is often surprised to see the roof swarming with serpents, that cling there without molesting and unmolested by the natives. But his surprise will increase upon going farther southward to the kingdom of Widah, when he finds that a serpent is the god of the country. This animal, which travellers describe as a huge overgrown creature, has its habitation, its temple, and its priests. These impress the vulgar with an opinion of its virtues; and numbers are daily seen to offer not only their goods, their provisions, and their prayers, at the shrine of their hideous deity, but also their wives and daughters. These the priests readily accept of, and after some days of penance, return them to their suppliants, much benefited by the serpent's supposed embraces. Such a complicated picture of ignorance and imposture gives no very favourable impressions of our fellow-creatures; but we may say, in defence of human nature, that the most frightful of reptiles is worshipped by the most uncultivated and barbarous of mankind.

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* THE VIPER OF SCRIPTURE.—The incantation of serpents is one of the most curious and interesting facts in natural history. This wonderful art, which disarms the fury, and soothes the wrath of the deadliest snake, and renders it obedient to the charmer's voice, is not an invention of modern times: for we discover manifest traces of it in the remotest antiquity. It is asserted, that Orpheus, who probably flourished soon after letters were introduced into Greece, knew how to still the hissing of the approaching snake, and to extinguish the poison of the creeping serpent. The Argonauts are said to have subdued by the power of song, the terrible dragon that guarded the golden fleece; and Ovid ascribes the same effect to the soporific influence of certain herbs, and magic sentences. It was the custom of others to fascinate the serpent, by touching it with the hand. Of this method Virgil takes notice, in the seventh book of the Æniad. But it seems to have been the general persuasion of the ancients, that the principal power of the charmer lay in the sweetness of the music. Pliny says, accordingly, that serpents were drawn from their lurking-places by the power of music. Seneca held the same opinion.

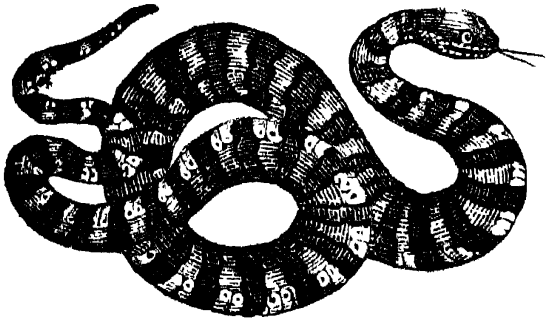
The wonderful effect which music produces on the serpent tribes is confirmed by the testimony of several respectable moderns. Adders swell at the sound of a flute, raising themselves up on the one half of their body, turning themselves round, beating proper time, and following the instrument. Their head, naturally round and long like an eel, becomes broad and flat like a fan. The tame serpents, many of which the Orientals keep in their houses, are known to leave their holes in hot weather, at the sound of a musical instrument, and to run upon the performer. Dr. Shaw had an opportunity of seeing a number of serpents keep exact time with the Dervishes in their circulating dances, running over their heads and arms, turning when they turned, and stopping when they stopped.

The rattle snake acknowledges the power of music as much as any of his family; of which the following instance is a decisive proof. When Chateaubriand was in Canada, a snake of this species entered their encampment; a young Canadian, one of the party, who could play on the flute, to divert his associates, advanced against the serpent with his new species of weapon. "On the approach of his enemy, the haughty reptile curled himself into a spiral line, flattened his head, inflated his cheeks, contracted his lips, displayed his envenomed fangs, and his bloody throat; his double tongue glowed like two flames of fire; his eyes were burning coals; his body, swoln with rage, rose and fell like the bellows of a forge; his dilated skin assumed a dull and scaly appearance, and his tail, which sounded the denunciation of death, vibrated with so great rapidity, as to resemble a light vapour. The Canadian now began to play upon his flute; the serpent started with surprise, and drew back his head. In proportion as he was struck with the magic effect, his eyes lost their fierceness, the oscillations of his tail became slower, and the sound which it emitted became weaker, and gradually died away. Less perpendicular upon their spiral line, the rings of the fascinated serpent were by degrees expanded, and sunk one after another upon the ground in concentric circles. The shades of azure green, white, and gold, recovered their brilliancy on his quivering skin, and slightly turning his head, he remained motionless in the attitude of attention and pleasure. At this moment the Canadian advanced a few steps, producing with his flute sweet and simple notes. The reptile inclining his variegated neck, opened a passage with his head through the high grass, and began to creep after the musician, stopping when he stopped, and beginning to follow him again as soon as he moved forward." In this manner he was led out of the camp, attended by a great number of spectators, both savages and Europeans, who could scarcely believe their eyes, when they beheld this wonderful effect of harmony. The assembly unanimously decreed, that the serpent which had so highly entertained them, should be permitted to escape.—NATURAL HISTORY OF THE BIBLE.

From this general picture of the serpent tribe, one great distinction obviously presents itself; namely, into those that are venomous and those that are wholly destitute of poison. To the first belong the viper, the rattlesnake, the cobra di capello, and all their affinities: to the other, the common black snake, the liboya, the boiguaca, the amphisbæna, and various others that, though destitute of venom, do not cease to be formidable. I will, therefore, give their history separately, beginning with the venomous class, as they have the strongest claims to our notice and attention.

CHAP. IX.

VENOMOUS SERPENTS IN GENERAL.



(The Viper.)

The poison of serpents has been for ages one of the greatest objects of human consideration. To us who seldom feel the vengeful wound, it is merely a subject of curiosity; but to those placed in the midst of the serpent tribe, who are every day exposed to some new disaster, it becomes a matter of the most serious importance. To remedy the bite of a serpent is considered among our physicians as one of the slightest operations in medicine; but among the physicians of the east, the antidotes for this calamity make up the bulk of their dispensaries. In our colder climates, the venom does not appear with that instantaneous operation which it exhibits in the warmer regions; for either its powers are less exquisite, or our fluids are not carried round in such rapid circulation.

In all countries, however, the poison of the serpent is sufficiently formidable to deserve notice, and to excite our attention to its nature and effects. It will, therefore, in the first place, be proper to describe its seat in the animal, as also the instrument by which the wound is made and the poison injected. In all this venomous class of reptiles, whether the viper, the rattle-snake, or the cobra di capello, there are two large teeth or fangs that issue from the upper jaw, and that hang out beyond the lower. The rest of the snake tribe are destitute of these; and it is most probable that wherever these fangs are wanting, the animal is harmless; on the contrary, wherever they are found it is to be avoided as the most pestilent enemy. These are the instruments that seem to place the true distinction between animals of the serpent kind; the wounds which these fangs inflict produce the most dangerous symptoms; the wounds inflicted by the teeth only, are attended with nothing more than the ordinary consequences attending the bite of any other animal. Our first great attention, therefore, upon seeing a serpent should be directed to the teeth. If it has the fang teeth, it is to be placed among the venomous class; if it wants them, it may be set down as inoffensive. I am not ignorant that many serpents are said to be dangerous whose jaws are unfurnished with fangs; but it is most probable that our terrors only have furnished these animals with venom; for of all the tribe whose teeth are thus formed, not one will be found to have a bag for containing poison, nor a conduit for injecting it into the wound. The black snake, the liboya, the blind worm, and a hundred others that might be mentioned, have their teeth of an equal size, fixed into the jaws, and with no other apparatus for inflicting a dangerous wound than a dog or a lizard; but it is otherwise with the venomous tribe we are now describing; these are well furnished, not only with an elaboratory where the poison is formed, but a canal by which it is conducted to the jaw, a bag under the tooth for keeping it ready for every occasion, and also an aperture in the tooth itself for injecting it into the wound. The venom contained in this bladder is a yellowish, thick, tasteless liquor, which injected into the blood is death, yet which may be swallowed without any danger.

The fangs that give the wound come next under observation; they are large in proportion to the size of the animal that bears them; crooked, yet sharp enough to inflict a ready wound. They grow one on each side, and sometimes two, from two movable bones in the upper jaw, which by sliding backward or forward, have a power of erecting or depressing the teeth at pleasure. In these bones are also fixed many teeth, but no way venomous, and only serving to take and hold the animal's prey. Besides this apt disposition of the fangs, they are hollow within, and have an opening towards the point like the slit of a pen, through which when the fang is pressed down upon the bladder where it grows, there is seen to issue a part of the venom that lies below.

In the East and West Indies, the number of noxious serpents is various; in this country we are acquainted only with one. The viper is the only animal in Great Britain from whose bite we have any thing to fear. In the tropical climates, the rattle-snake, the whip-snake, and the cobra di capello, are the most formidable, though by no means the most common. From the general notoriety of these particular serpents, and the universal terror which they occasion, it would seem that few others are possessed of such powerful malignity.

Vipers are found in many parts of this island; but the dry, stony, and in particular the chalky, countries abound with them.* This animal seldom grows to a greater length than two feet; though sometimes they are found above three. The ground colour of their bodies is a dirty yellow; that of the female is deeper. The back is marked the whole length with a series of rhomboid black spots, touching each other at the points; the sides with triangular ones, the belly entirely black. It is chiefly distinguished from the common black snake by the colour, which in the latter is more beautifully mottled, as well as by the head, which is thicker than the body; but particularly by the tail, which in the viper, though it ends in a point, does not run tapering to so great a length as in the other. When, therefore, other distinctions fail, the difference of the tail can be discerned at a single glance.

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* VIPERS IN ENGLAND.—Providence has been so indulgent to us as to allow of but one venomous reptile of the serpent kind in these kingdoms, and that is the viper. As you propose the good of mankind to be an object of your publications, you will not omit to mention common salad oil as a sovereign remedy against the bite of the viper. As to the blind-worm, (*anguis fragilis*, so called because it snaps in sunder with a small blow,) I have found, on examination, that it is perfectly innocuous. A neighbouring yeoman (to whom I am indebted for some good hints) killed and opened a female viper about the 27th of May: he found her filled with a chain of eleven eggs, about the size of those of a blackbird; but none of them were advanced so far towards a state of maturity as to contain any rudiments of young. Though they are oviparous, yet they are viviparous also, hatching their young within their bellies, and then bringing them forth. Whereas snakes lay chains of eggs every summer in my melon-beds, in spite of all that my people can do to prevent them; which eggs do not hatch till the spring following, as I have often experienced. Several intelligent folks assure me, that they have seen the viper open her mouth and admit her helpless young down her throat on sudden surprises, just as the female opossum does her brood into the pouch under her belly, upon the like emergencies; and yet the London viper-catchers insist on it, to Mr. Barrington, that no such thing ever happens. The serpent kind eat, I believe, but once in a year; or, rather, but only just at one season of the year. Country people talk much of a water-snake, but. I am pretty

The viper differs from most other serpents in being much slower, as also in excluding its young completely formed, and bringing them forth alive. The kindness of Providence seems exerted not only in diminishing the speed, but also the fertility, of this dangerous creature. They copulate in May, and are supposed to be about three months before they bring forth, and have seldom above eleven eggs at a time. These are of the size of a blackbird's eggs, and chained together in the womb like a string of beads. Each egg contains from one to four young ones; so that the whole of a brood may amount to about twenty or thirty. They continue in the womb till they come to such perfection as to be able to burst from the shell; and they are said by their own efforts to creep from their confinement into the open air, where they continue for several days without taking any food whatsoever.*

The viper is capable of supporting very long abstinence, it being known that some have been kept in a box six months without food; yet during the whole time they did not abate of their vivacity. They feed only a small part of the year, but never during their confinement; for if mice, their favourite diet, should at that time be thrown into their box, though they will kill, yet they will never eat them. When at liberty, they remain torpid throughout the winter; yet, when confined, have never been observed to take their annual repose. Their poison, however, decreases in proportion to the length of their confinement; and it is thought, that the virtues of the animal's flesh are, by the same restraints, considerably lessened.

They are usually taken with wooden tongs, by the end of the tail, which may be done without danger; for, while held in that position, they are unable to wind themselves up to hurt their enemy: yet, notwithstanding this precaution, the viper-catchers are frequently bit by them; but, by the application of olive-oil, the bite is effectually cured.†

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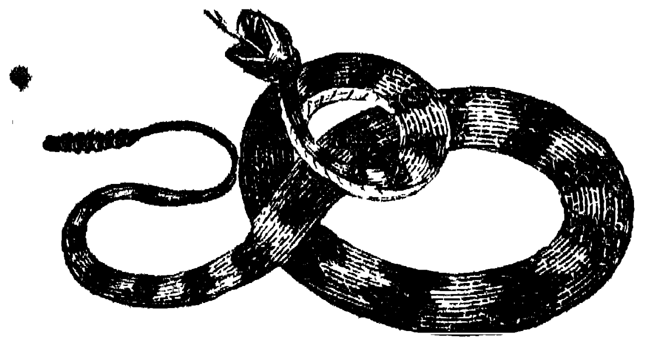
sure, without any reason; for the common snake (*coluber natrix*) delights much to sport in the water, perhaps with a view to procure frogs, and other food.

* Habits of the Viper.—We have been often assured (says Mr. Pennant) by intelligent people, of the truth of a fact, that the young of the viper when terrified will run down the throat of the parent, and seek shelter in its belly in the same manner as the young of the opossum retire into the ventral pouch of the old one. From this (continues he) some have imagined that the viper is so unnatural as to devour its own young; but this deserves no credit, as these animals live upon frogs, toads, lizards, and young birds, which they swallow whole, though the morsel is often three times as thick as their own body.

† Snake-catchers.—The secret of rendering docile, and handling with impunity, the most venomous serpents, which has so long been in the possession of the inhabitants of Western India, is not unknown in China. It is observed that the native snake-catchers here rub their hands, previously to taking hold of the snake, with an antidote composed of pounded herbs. The virtue of the preparation is such, that they hold with the naked hand, and provoke fearlessly the deadly cobra di capello, or spectacle viper, a serpent which, next to the rattle-snake of North America, is perhaps one of the most dangerous reptiles in existence. This serpent, in common with others of a similar nature, are not unfrequently met with in Canton in the possession of these men, who, for a trifling gratuity, exhibit them to the curious spectator.—Canton Register.

Bites of Venomous Reptiles.—M. le Dr. Record, sen., discovered, during a long residence in America, what he considers a sure mode of preventing mischief from such bites. "It is sufficient," he says, "to pour a few drops of tincture of cantharides on the wound, to cause a redness and vesication;



(The Rattle-snake.)

The rattle-snake is bred in America, and in no part of the old world. Some are as thick as a man's leg, and six feet in length; but the most usual size is from four to five feet long. In most particulars it resembles the viper: like that animal, having a large head and a small neck, being of a dusky colour, and furnished with fangs that inflict the most terrible wounds. It differs, however, in having a large scale, which hangs like a penthouse over each eye The eye also is furnished with a nictitating membrane, that preserves it from dust; and its scales are of a considerable degree of hardness. They are of an orange, tawny, and blackish colour on the back; and of an ash-colour on the belly, inclining to lead. The male may be readily distinguished from the female, by a black velvet spot on the head, and by the head being smaller and longer. But that which, besides their superior malignity, distinguishes them from all other animals, is their rattle, an instrument lodged in their tail, by which they make such a loud rattling noise, when they move, that their approach may readily be perceived, and the danger avoided. This rattle, which is placed in the tail, somewhat resembles, when taken out of the body, the curb chain of a bridle: it is composed of several thin, hard, hollow bones, linked to each other, and rattling upon the slightest motion. It is supposed by some, that the snake acquires an additional bone every year; and that, from hence, its age may be precisely known: however this may be, certain it is, that the young snakes, of a year or two old, have no rattles at all; while many old ones have been killed, that had from eleven to thirteen joints each. They shake and make a noise with these rattles with prodigious quickness when they are disturbed; however, the peccary and the vulture are no way terrified at the sound, but hasten, at the signal, to seize the snake, as their most favourite prey.

It is very different with almost every other animal. The certain death which ensues from this terrible creature's bite, makes a solitude wherever it is heard. It moves along with the most majestic rapidity; neither seeking to offend the larger animals, nor fearing their insults. If unprovoked, it never meddles with any thing but its natural prey; but when accidentally trod upon, or pursued to be destroyed, it then makes a dreadful and desperate defence. It erects itself upon its tail, throws back the head, and inflicts its wound in a moment; then parts, and inflicts a second wound: after which, we are told, by some, that it remains torpid and inactive, without even attempting to escape.

The very instant the wound is inflicted, though small in itself, it appears more painful than the sting of a bee. This pain, which is so suddenly felt, far from abating, grows every moment more excruciating and dangerous: the limb swells; the venom reaches the head, which is soon of a monstrous size; the eyes are red and fiery; the heart beats quick, with frequent interruptions: the pain becomes insupportable, and some expire under it in five or six hours; but others, who are of stronger constitutions, survive the agony for a few hours longer, only to sink under a general mortification, which ensues, and corrupts the whole body.*

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not only is the poison rendered harmless, but the stings of the reptiles are removed with the epidermis that the blister raises."—Revue Med. 88.

* A Den of Rattle-snakes.—An emigrant family inadvertently fixed their cabin on the shelving declivity of a ledge, that proved a den of rattle-snakes. Warmed by the first fire on the hearth of the cabin, the terrible reptiles issued in numbers, and, of course, in rage, by night, into the room where the whole family slept. As happens in those cases, some slept on the floor, and some in beds. The reptiles spread in every part of

As a gentleman in Virginia was walking in the fields for his amusement, he accidentally trod upon a rattle-snake, that had been lurking in a stony place; which, enraged by the pressure, reared up, bit his hand, and shook its rattle. The gentleman readily perceived that he was in the most dreadful danger; but unwilling to die unrevenged, he killed the snake, and carrying it home in his hand, threw it on the ground before his family, crying out, I am killed, and there is my murderer.! In such an extremity, the speediest remedies were the best. His arm, which was beginning to swell, was tied up near the shoulder, the wound was anointed with oil, and every precaution taken to stop the infection. By the help of a very strong constitution he recovered; but not without feeling the most various and dreadful symptoms for several weeks together. His arm, below the ligature, appeared of several colours, with a writhing among the muscles, that, to his terrified imagination, appeared like the motions of the animal that had wounded him. A fever ensued; the loss of his hair, giddiness, drought, weakness, and nervous faintings: till, by slow degrees, a very strong habit overpowered the latent malignity of the poison.

Several remedies have been tried to alleviate this calamity. A decoction of the Virginian snake-root is considered as the most effectual; and at the same time the head of the animal bruised and laid upon the part affected, is thought to assist the cure. In general, however, it is found to be fatal; and the Indians, sensible of this, take care to dip their arrows in the poison under the rattle-snake's fangs, when they desire to take a signal revenge of their enemies.*

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the room, and mounted on every bed. Children were stung in the arms of their parents, and in each other's arms. Imagination dares not dwell on the horrors of such a scene. Most of the family were bitten to death; and those who escaped, finding the whole cabin occupied by these horrid tenants, hissing, and shaking their rattles, fled from the house by beating off the covering of the roof, and escaping in that direction.—Flint's Geog. and Hist. of the United States.

* Death by the Bite of a Rattle-snake.—At the meeting of the Academy of Sciences of France on the 9th of April, 1827, some documents were presented by M. Dumerel, connected with the death of Mr. Drake by the bite of a rattle-snake, forming part of a collection of reptiles which that person had exhibited at London, and had taken to France for the same purpose. These documents were transmitted to the Academy by the Minister of the Interior; and seem to have excited fears in some of the members, lest, the climate of France being favourable, some of these dangerous reptiles might escape and propagate.

From these documents it appears, that Mr. Drake arrived at an inn in Rouen on the 8th of February, with three live rattle-snakes and some young crocodiles, and that, notwithstanding his care to preserve them from cold on the road, he saw with grief on his arrival that the finest of the three was dead. The dead animal was removed from the cage, and the cage itself, with the other two, were taken into the dining-room, and placed near the stove. Here Mr. Drake endeavoured to rouse them with a stick; but, perceiving that one of the two gave no signs of animation, he opened the cage, took the serpent by the head and tail, and approaching a window to ascertain by handling if life was extinct, the animal turned its head half round, and fixed one of its fangs in the posterior external part of the left hand. Mr. Drake shrieked, pronounced some words in English, according to the report, and was replacing the serpent in the cage, when it again bit him on the palm of the same hand. Mr. Drake now ran out into the court calling eagerly for a surgeon; and, not finding water readily, rubbed his hand upon some ice, which he found at the door. Two minutes after, having procured a cord, he himself made a ligature on the arm above the hand. Notwithstanding these precautions, his agitation from the fear of the consequences continued to increase till the arrival of Dr. Pihorel. The presence of this gentleman somewhat composed the feelings of Mr. Drake; and he saw with eager joy the chafing-dish and irons arrive, with which the wounds were to be cauterized. This operation was instantly performed, and the patient took internally half a glassful of olive oil. Drake seemed now to have resumed his tranquillity. But in a few minutes more symptoms made their appearance which rendered the case hopeless, and he died in eight hours and three quarters after the bites.

The body was afterwards opened. The internal organs appeared healthy; the brain and spinal cord were unaltered. The membrane which covered these parts, however, was observed to have a reddish tinge. The veins presented no trace of inflammation; and the only appearance of derangement in the system, consisted in the veins of the affected side having the blood curdled or clotted.

Thus much concerning this animal is agreed upon by every naturalist: there are other circumstances in its history, which are not so well ascertained. And first, its motion, which some describe as the swiftest imaginable; asserting that its Indian name of Ecacoalt, which signifies the wind serpent, implies its agility: others, on the contrary, assert that it is the slowest and the most sluggish of all serpents; and that it seldom moves from one place. In this opposition of opinions, there are others, who assert, that on even ground it moves but slowly; but then, among rocks, that it goes at a great rate. If we may argue from analogy, the opinion of those who contend for its slow motion seems the most probable; as the viper, which it so very much resembles, is remarkable among serpents for its inactivity.

It is said also by some, that the rattle-snake has a power of charming its prey into its mouth; and this is as strongly contradicted by others. The inhabitants of Pennsylvania are said to have opportunities of observing this strange fascination every day. The snake is often seen basking at the foot of a tree, where birds and squirrels make their residence. There, coiled upon its tail, its jaws extended, and its eyes shining like fire, the rattle-snake levels its dreadful glare upon one of the little animals above. The bird or the squirrel, whichever it may be, too plainly perceives the mischief meditating against it, and hops from branch to branch, with a timorous, plaintive sound, wishing to avoid, yet incapable of breaking through the fascination: thus it continues for some time its feeble efforts and complaints, but is still seen approaching lower and lower towards the bottom branches of the tree, until, at last, as if overcome by the potency of its fears, it jumps down from the tree directly into the throat of its frightful destroyer.

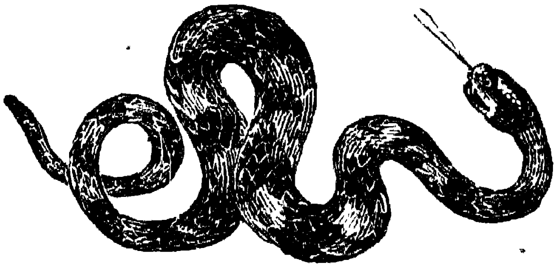
In order to ascertain the truth of this story, a mouse was put into a large iron cage, where a rattle-snake was kept, and the effect carefully observed. The mouse remained motionless at one end of the cage; while the snake, at the other, continued fixed, with its eyes glaring full on the little animal, and its jaws opened to their widest extent: the mouse for some time seemed eager to escape; but every effort only served to increase its terrors, and to draw it still nearer the

In a curious memoir on the habits of the rattle-snake, read lately by M. Audubon at the Wernerian Society, that gentleman mentioned a circumstance which tends to show that the poisonous fangs of this reptile, even when withdrawn from the animal, retain their virulence for years. A person had been bitten by a rattle-snake in the woods through a strong boot. He died without the cause of his death being properly investigated. The boots descended to his son, who, after putting them on, was taken suddenly ill, and also died. The effects of this last were brought to sale; and a younger brother fancying the boots, or willing to preserve some memorial of his father and brother, was the purchaser. He used them only once, when he also fell ill and died. The medical men, whom such an occurrence had led to investigate its cause, at last ripped up the fatal boot, and found, firmly fixed in the substance of the leather, the fang of the rattle-snake, which had thus caused the death of three individuals. Rattle-snakes, M. Audubon further observed, are often found coiled up and torpid when the temperature is low; and he himself once narrowly escaped from perhaps a serious accident, in trusting to their continued torpidity. He had found an excellent specimen coiled up and torpid, which he put in his knapsack along with some wild ducks which he had shot. The motion and heat of his body, together with the additional heat afforded by a sportsman's fire at a meal in the woods, had, however, revived the animal; and the motions of his knapsack, observed from the outside, indicated life within. M. Audubon at first thought that some of his ducks, imperfectly killed, had found their situation irksome, and were testifying their impatience; but the recollection of the rattle-snake flashing at once on his mind, he threw off his bag, ducks, and reptile, altogether. The removal of the animal to a colder temperature brought on again its torpidity. He carried the snake home; and the identical specimen, if we rightly understood him, is now in the Museum of the Lyceum of Natural History of New York.—Brewster's Journal.

Poison of Rattle-snakes.—M. E. Rousseau has ascertained, by experiments made with the fangs of a dead rattle-snake, that the venom of these animals preserves its injurious qualities for a long time, even in our climates, and at a very advanced part of the year. A pigeon wounded by them died in a very short period.—Bul. Phil.

enemy; till, after several ineffectual attempts to break the fascination, it was seen to run into the jaws of the rattle-snake, where it was instantly killed.*

To this formidable class might be added the Asp, whose bite, however, is not attended with those drowsy symptoms which the ancients ascribed to it. The Jaculus of Jamaica, also, is one of the swiftest of the serpent kind. The Hæmorrhois, so called from the hæmorrhages which its bite is said to produce; the Seps, whose wound is very venomous, and causes the part affected to corrupt in a very short time; the Coral Serpent, which is red, and whose bite is said to be fatal. But of all others, the Cobra di Capello, or Hooded Serpent, inflicts the most deadly and incurable wounds. Of this formidable creature there are five or six different kinds; but they are all equally dangerous, and their bite followed by speedy and certain death. It is from three to eight feet long, with two large fangs hanging out of the upper jaw. It has a broad neck, and a mark of dark brown on the forehead: which, when viewed front-



(The Egyptian Asp.)

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* On the Fascination of Serpents.—It appears to me, says Dr Hancock, that that property of serpents which has obtained the name of fascination, does not exclusively belong to any certain species, but that it is in some measure common to all the serpent race; and that there are a few of the more subtle and cunning ones, who know how to improve by their natural endowments, and to turn those powers to advantage in their predatory pursuits.

I am decidedly of opinion, from the observations I have been able to make, as well as from the testimony of others, that there is in reality no such property as fascination in serpents. It is not a faculty of charming or of fascinating, in the usual acceptation of the term, which enables certain serpents to take birds; but, on the contrary, their hideous form and gestures, which strikes the timid animals with impressions of horror, stupifying them with terror, and depriving them of their proper sensations, which renders them unfit for any exertion.

How, indeed, is it possible that a form so terrific and forbidding as that of the crotalus, should be possessed of a power to render itself agreeable or inviting. It is, on the contrary, natural to suppose that it is the terrifying, not the charming, principle by which serpents of the most disgusting or hideous forms are most successful in taking birds; and this we find to be actually the case, for those serpents to which has been ascribed the power of fascinating, are among the most terrific of the tribe.

The torpedo benumbs its prey with an electrical shock; but the serpent disables the more timid birds by the mere presentation of his horrible front. The one hurtful or destructive agent is communicated by the touch, or some conducting medium, as water, and acts with energy upon the muscular fibre; the other finds its way by the organ of vision, and exerts its influence upon the sensorium commune or brain, and thence paralyzing the whole nervous and muscular system. No wonder that these small birds, so feebly constituted, and the most sensible perhaps of all animals to impressions of fear, should fall insensibly into the devouring jaws of their terrific adversary.

Thus the fascinating power attributed to serpents, if properly viewed, falls entirely to the ground. It is not the timid little bird or rabbit alone which is thus overcome, but the larger animals also, and even man in some instances. An occurrence of this kind is related of a negro, belonging to Mr. John Henley, who, in the swamp of Pomeroon, fell in with a serpent of great magnitude, as the negroes asserted, and was so dreadfully terrified that he fainted away and was picked up for dead by his companion. The serpent was said to be a camudi (*boa scytale*), and might have made an easy prey of the man, but was overgorged. They rarely, however, attack man, unless much provoked.

In the Oronoko, cats are said to be a mortal enemy to the serpent tribe; that they kill the crotalus, and even the coral snake, which is considered by the Spaniards to be very poisonous, though, I believe, it is harmless; and it is said are not unfrequently killed in a conflict with the former. I was told that, on some of the Llanos, where rattle-snakes abound, cats are frequently kept for this purpose by the inhabitants.—Jameson's Journ.

wise, looks like a pair of spectacles; but behind, like the head of a cat. The eyes are fierce, and full of fire; the head is small, and the nose flat, though covered with very large scales, of a yellow ash-colour; the skin is white, and the large tumour on the neck is flat, and covered with oblong, smooth scales. The bite of this animal is said to be incurable, the patient dying in about an hour after the wound; the whole frame being dissolved into one putrid mass of corruption.*

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* **Snakes of Demerara.**—Snakes are frequently met with in the woods betwixt the sea-coast and the rock Saba, chiefly near the creeks and on the banks of the river. They are large, beautiful, and formidable. The rattle-snake seems partial to a tract of ground known by the name of Canal, No. 3; there the effects of his poison will be long remembered.

The camoudi has been killed from thirty to forty feet long; though not venomous, his size renders him destructive to the passing animals. The Spaniards in the Oroonoque positively affirm that he grows to the length of seventy or eighty feet, and that he will destroy the strongest and largest bull. His name seems to confirm this; there he is called "matatoro," which literally means "bull killer." Thus he may be ranked amongst the deadly snakes; for it comes nearly to the same thing in the end, whether the victim dies by poison from the fangs which corrupts his blood and makes it stink horribly, or whether his body be crushed to mummy, and swallowed by this hideous beast.

The whip-snake, of a beautiful changing green, and the coral, with alternate broad traverse bars of black and red, glides from bush to bush, and may be handled with safety; they are harmless little creatures.

The labarri snake is speckled, of a dirty brown colour, and can scarcely be distinguished from the ground or stump on which he is coiled up; he grows to the length of about eight feet, and his bite often proves fatal in a few minutes.

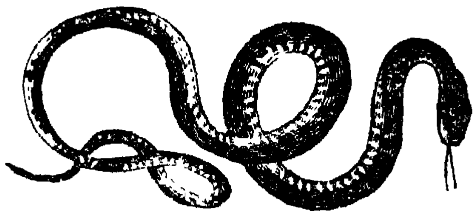
Unrivalled in his display of every lovely colour of the rainbow, and unmatched in the effects of his deadly poison, the counacouchi glides undaunted on, sole monarch of these forests; he is commonly known by the name of the bush-master. Both man and beast fly before him, and allow him to pursue an undisputed path. He sometimes grows to the length of fourteen feet.

A few small caimen, from two to twelve feet long, may be observed now and then in passing up and down the river; they just keep their heads above water, and a stranger would not know them from a rotten stump.

Snakes in these wilds are certainly an annoyance, though, perhaps, more in imagination than reality, for you must recollect that the serpent is never the first to offend; his poisonous fang was not given him for conquest; he never inflicts a wound with it but to defend existence. Provided you walk cautiously, and do not absolutely touch him, you may pass in safety close by him. As he is often coiled up on the ground, and amongst the branches of the trees above you, a degree of circumspection is necessary, lest you unwarily disturb him. One morning I had been following a new species of parouquet, and the day being rainy, I had taken an umbrella to keep the gun dry, and had left it under a tree; whilst searching about for it I observed a young coulacanara, ten feet long, moving slowly onwards in a path where timber had formerly been dragged along; I saw he was not thick enough to break my arm in case he got twisted round it. There was not a moment to be lost. I laid hold of his tail with the left hand, one knee being on the ground; with the right I took off my hat, and held it as you would hold a shield for defence. The snake instantly turned and came on at me with his head about a yard from the ground, as if to ask me what business I had to take liberties with his tail. I let him come, hissing and open-mouthed, within two feet of my face, and then, with all the force I was master of, I drove my fist, shielded by my hat, full in his jaws. He was stunned and confounded by the blow, and ere he could recover himself, I had seized his throat with both hands in such a position that he could not bite me; I then allowed him to coil himself round my body, and marched off with him as my lawful prize. He pressed me hard, but not alarmingly so.—Waterton's Wanderings.

CHAP. X.

SERPENTS WITHOUT VENOM.



The class of serpents without poison, may be distinguished from those that are venomous, by their wanting the fang teeth: their heads also are not so thick in proportion to their bodies; and, in general, they taper off to the tail more gradually in a point. But notwithstanding their being destitute of venom, they do not cease to be formidable: some grow to a size by which they become the most powerful animals of the forest; and even the smallest and most harmless of this slender tribe, find protection from the similitude of their form.

The fangs make the great distinction among serpents; and all this tribe are without them. Their teeth are short, numerous, and, in the smaller kinds, perfectly inoffensive: they lie in either jaw, as in frogs and fishes, their points bending backwards, the better to secure their prey. They want that artificial mechanism by which the poisonous tribe inflict such deadly wounds: they have no gland in the head for preparing venom; no conduits for conveying it to the teeth; no receptacles there; no hollow in the instrument that inflicts the wound. Their bite, when the teeth happen to be large enough to penetrate the skin, for in general they are too small for this purpose, is attended with no other symptoms than those of an ordinary puncture; and many of this tribe, as if sensible of their own impotence, cannot be provoked to bite, though never so rudely assaulted. They hiss, dart out their forky tongues, erect themselves on the tail, and call up all their terrors to intimidate their aggressors; but seem to consider their teeth as unnecessary instruments of defence, and never attempt to use them.

From hence we may distinguish the unvenomous tribe into two kinds: first, into those which are seldom found of any considerable magnitude, and that never offend animals larger or more powerful than themselves, but which find their chief protection in flight, or in the doubtfulness of their form; secondly, into such as grow to an enormous size, fear no enemy, but indiscriminately attack all other animals and devour them. Of the first kind is the Common Black Snake, the Blind Worm, the Esculapian Serpent, the Amphisbæna, and several others. Of the second, the Liboya, the Boiguacu, the Depona, and the Boiquatrara.

The Black Snake is the largest of English serpents, sometimes exceeding four feet in length. The neck is slender; the middle of the body thick; the back and sides covered with small scales; the belly with oblong, narrow, transverse plates: the colour of the back and sides are of a dusky brown; the middle of the back marked with two rows of small black spots, running from the head to the tail; the plates on the belly are dusky; the scales on the sides are of a bluish white; the teeth are small and serrated, lying on each side of the jaw in two rows. The whole species is perfectly inoffensive; taking shelter in dunghills, and among bushes in moist places; from whence they seldom remove, unless in the midst of the day, in summer, when they are called out by the heat to bask themselves in the sun. If disturbed or attacked, they move away among the brambles with great swiftness, but if too closely pursued, they hiss and threaten, and thus render themselves formidable, though incapable of offending.*

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* **Habits of the Common Snake in Captivity.** — This has been a remarkably good season, both for vegetables and animals. It has been a singular time for adders, snakes,

The black snake preys upon frogs, insects, worms, mice, and young birds; and, considering the smallness of the neck, it is amazing how large an animal it will swallow. The black snake of Virginia, which is larger than ours, and generally grows to six feet long, takes a prey proportionable to its size; par-

and lizards: I never saw so many as I have seen this year in all my life. I have been trying, a great part of this summer, to domesticate a common snake, and make it familiar with me and my children; but all to no purpose, notwithstanding I favoured it with my most particular attention. It was a most beautiful creature, only two feet seven inches long. I did not know how long it had been without food when I caught it; but I presented it with frogs, toads, worms, beetles, spiders, mice, and every other delicacy of the season. I also tried to charm it with music, and my children stroked and caressed it; but all in vain: it would be no more familiar with any of us than if we had been the greatest strangers to it, or even its greatest enemies. I kept it in an old barrel, out of doors, for the first three weeks: during that time, I can aver, it ate nothing; but, after a very wet night, it seemed to suffer from the cold. I then put it into a glass vessel, and set it on the parlour chimney-piece, covering the vessel with a piece of silk gauze. I caught two live mice, and put them in to it; but they would sooner have died of hunger than the snake would have eaten them: they sat shivering on its back, while it lay coiled up as round as a ball of worsted. I gave the mice some boiled potatoes, which they ate: but the snake would eat neither the mice nor the potatoes. My children frequently took it out in their hands, to show it to their schoolfellows; but my wife, and some others, could not bear the sight of it. I one day took it in my hand, and opened its mouth with a penknife, to show a gentleman how different it was from that of the adder, which I had dead by me: its teeth being no more formidable or terrific than the teeth of a trout or eel; while the mouth of the adder had two fangs, like the claws of a cat, attached to the roof of the mouth, no way connected with its jaw-teeth. While examining the snake in this manner, it began to smell most horridly, and filled the room with an abominable odour; I also felt, or thought I felt, a kind of prickly numbness in the hand I held it in, and did so for some weeks afterwards. In struggling for its liberty, it twisted itself round my arm, and discharged its excrements on my coat-sleeve, which seemed nothing more than milk, or like the chalkings of a woodcock. It made its escape from me several times by boring a hole through the gauze; I had lost it for some days at one time, when at length it was observed peeping out of a mouse-hole behind one of the cellar steps. Whether it had caught any beetles or spiders in the cellar, I cannot say; but it looked as fierce as a hawk, and hissed and shook its tongue, as in open defiance. I could not think of hurting it by smoking it out with tobacco or brimstone; but called it my fiery dragon which guarded my ale cellar. At length I caught it, coiled up on one of the steps. I put it again into an American flour-barrel; but it happened not to be the same as he had been in, and I observed a nail protruding through the staves about half way up. This, I suppose, he had made use of to help his escape; for he was missing one morning about ten o'clock: I had seen him at nine o'clock; so I thought he could not be far off. I looked about for him for half an hour, when I gave up the hunt in despair. However, at one o'clock, as the men were going from dinner, one of them observed the rogue hiding himself under a stone, fifty yards from the house. "Dang my buttons," said he, "if here is not master's snake." He came back and told my wife, who told him to go and kill it. It happened to be *washing-day*: the washerwoman gave him a pailful of scalding soapsuds to throw on it; but whether he was most afraid of me or of the snake is still a question: however, the washerwoman brought it home with the tongs, and dropped it into the dolly-tub. It dashed round the tub with the velocity of lightning; my daughter, seeing its agony, snatched it out of the scalding liquid, but too late: it died in a few minutes. I was not at all angry with my wife: I had had my whim, and she had hers. I had got all the knowledge I wanted to get; I had learned that it was of no use for a human being, who requires food three times a day, to domesticate an animal which can live weeks and months without food: for, as the saying is, "Hunger will tame any thing;" and without hunger you can tame nothing. I have also learned that the serpent, instead of being the emblem of wisdom, should have been an emblem of stupidity.

The stench emitted by the common snake, when molested, is superlatively noisome; and is given off so powerfully and copiously, that it infects the air around to a diameter of several yards. This I witnessed on observing a bitch dog kill a rather large snake; in which act two points besides the odour effused were notable. The coils of the snake formed, as it were, a circular wall; and in the circular space between it, the snake sunk its head, as if for protection. The dog's efforts were to catch and crush the head; and, shrivelling up her fleshy lips, "which all the while ran froth," she kept thrusting the points of her jaws into tridges, chickens, and young ducks. It is generally found in the neighbourhood of the hen-roost, and will devour the eggs even while the hen is sitting upon them: these it swallows whole; and often, after it has done the mischief, will coil itself round in the nest.

The whole of this tribe are oviparous, excluding eighty or a hundred eggs at a time, which are laid in dunghills or hot-beds; the heat of which, aided by that of the sun, brings them to maturity. During winter they lie torpid, in banks of hedges, and under old trees.

The Blind Worm is another harmless reptile, with a formidable appearance. The usual length of this species is eleven inches. The eyes are red; the head small; the neck still more slender: from that part the body grows suddenly, and continues of an equal bulk to the tail, which ends quite blunt: the colour of the back is sinereous, marked with very small lines, composed of minute black specks; the sides are of a reddish cast; the belly dusky; and marked like the back. The motion of this serpent is slow; from which, and from the smallness of the eyes, are derived its names; some calling it the Slow, and some the Blind Worm. Like all the rest of the kind in our climates, they lie torpid during winter; and are sometimes found, in vast numbers, twisted together. This animal, like the former, is perfectly innocent; however, like the viper, it brings forth its young alive. Gesner tells us, that one of these being struck on the head when it was pregnant, it immediately cast forth its young.

But in the larger tribe of serpents, there is nothing but danger to be apprehended. This formidable class, though without venom, have something frightful in their colour, as well as their size and form. They want that vivid hue with which the savages are so much pleased in the lesser kinds; they are all found of a dusky colour, with large teeth, which are more formidable than dangerous.

The first of this class, is the Great Jiboya of Java and Brazil, which Legaut affirms, he has seen fifty feet long. Nor is he singular in this report, as many of the missionaries affirm the same; and we have the concurrent testimony of historians as a further proof. The largest animal of this kind, which has been brought into Europe, is but thirty-six feet long; and it is probable, that much greater have been seen and destroyed, before they were thought worth sending so far to satisfy European curiosity. The most usual length, however, of the jiboya, is about twenty feet, and the thickness in proportion. The teeth are small in proportion to the body; nor are they used but when it seizes the smallest prey. It lies in wait for wild animals near the path, and when it throws itself upon them, it wraps them round so closely as to break all the bones; then moistening the whole body over with its slaver, it makes it fit for deglutition, and swallows it whole.

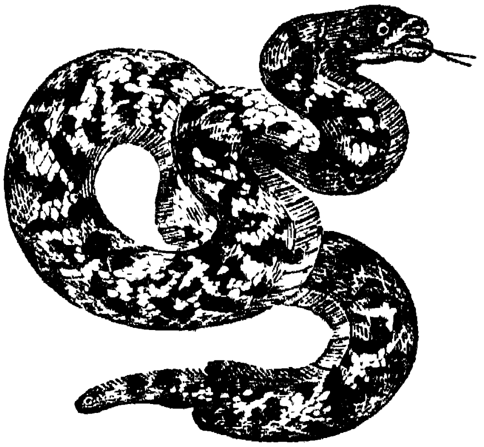
The Boiguacu is supposed to be the next in magnitude, and has often been seen to swallow a goat whole. It is thickest in the middle of the body, and grows shorter and smaller towards the head and the tail: on the middle of the back, there is a chain of small black spots running along the length of it; and on each side, there are large, round, black spots, at some distance from each other, which are white in the centre: between these, near the belly, there are two rows of lesser black spots, which run parallel to the back. It has a double row of sharp teeth in each jaw, of a white colour, and shining like mother-of-pearl. The head is broad; and over the eyes it is raised into two prominences: near the extremity of the tail there are two claws, resembling those of birds.

These serpents lie hid in thickets, from whence they sally out unawares, and raising themselves upright on their tails, will attack both men and beasts. They make a loud hissing noise when exasperated; and sometimes winding up trees, will dart down upon travellers, and twist themselves so closely round their bodies, as to dispatch them in a very few minutes. Condamine, however

the circular pit aforesaid, and catching at and fracturing the head. During the progress of these acts, she, every few seconds, snorted, and shook off the froth, of which she seemed sedulously careful to free herself, and barked at the conquered snake. The dog was a most determined vermin-killer, and in rats, &c., quite an accomplished one; but snakes did not often come in her way.—Correspondent of the Magazine of Natural History.

affirms, that their bite is not dangerous, for though the teeth are so large as to inspire the beholder with terror, yet the wound they make is attended with no dangerous consequences whatever. Dellon affirms, that they generally haunt desert places; and though they are sometimes seen near great towns, or on the banks of rivers, yet it is generally after some great inundation: he never saw any but what were dead; and they appeared to him like the trunk of a great tree lying on the ground.

To this class of large serpents we may refer the Depona, a native of Mexico, with a very large head and great jaws.



Such are the most noted animals of the serpent tribe: but to recount all, would be a vain, as well as a useless endeavour. In those countries where they abound, their discriminations are so numerous, and their colours so various, that every thicket seems to produce a new animal. The same serpent is often found to bring forth animals of eight or ten different colours: and the naturalist who attempts to arrange them by that mark, will find that he has made distinctions which are entirely disowned by Nature: however, a very considerable number might be added to enlarge the catalogue; but having supplied a general history, the mind turns away from a subject where every object presents something formidable or loathsome to the imagination. Indeed, the whole tribe resemble each other so nearly, that the history of one may almost serve for every other. They are all terrible to the imagination, all frightful to behold in their fury, and have long been considered as a race of animals between whom and man there is a natural antipathy.

A HISTORY OF INSECTS.

CHAP. I.

OF INSECTS IN GENERAL.*

Having gone through the upper ranks of nature, we descend to that of insects, a subject almost inexhaustible, from the number of its tribes and the variety of their appearance. Those who have professedly written on this subject seem to consider it as one of the greatest that can occupy the human mind, as the most pleasing in animated nature. "After an attentive examination," says Swammerdam, "of the nature and anatomy of the smallest as well as the largest animals, I cannot help allowing the least an equal, or perhaps a superior, degree of dignity. If, while we dissect with care the larger animals, we are filled with wonder at the elegant disposition of their parts, to what an height is our astonishment raised, when we discover all these parts arranged in the least in the same regular manner! Notwithstanding the smallness of ants, nothing hinders our preferring them to the largest animals; if we consider either their unwearied diligence, their wonderful strength, or their inimitable propensity to labour. Their amazing love to their young is still more unparalleled among the larger classes. They not only daily carry them to such places as may afford them food, but if by accident they are killed, and even cut into pieces, they, with the utmost tenderness, will carry them away piecemeal in their arms. Who can show such an example among the larger animals, which are dignified with the title of perfect? Who can find an instance in any other creature that can come in competition with this?"†

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* Insects.—The term insect is often applied not only to the grasshopper, the fly, and the beetle, but to other small animals, such as slugs and worms. If, however, one of the former be examined, its body will appear insected, being divided, as it were, into three principal pieces; the head, the trunk, and the abdomen; and it is only where such a division is more or less obvious, that this name can properly be given. A recollection that the English word is probably a corruption or contraction of a Latin term, that signifies "cut between," will effectually guard against the mistake.—Ed.

† Instincts of Nature.—As Nature has endued physical bodies with peculiar properties, such as gravity, attraction, and the like, so has she bestowed others on animal bodies; and, if I may be allowed the expression, incorporated the most essential maxims of her wisdom into living machines, just as an artist makes an automaton that performs certain human actions, but in other respects can do no more than any other machine. The whole animal kingdom is full of instances of this sort. It is not out of respect, as every reader will easily believe, that a certain beetle described by naturalists, buries the dead moles and toads which it finds, but the instinct which teaches it to subsist upon those animals, and to deposit its eggs in them, impels it to this action. The pigeons which are trained to carry letters to distant places are not more sensible than other pigeons: nothing but the blind instinct to return to their young governs them in this proceeding. It is requisite that they should have left young at the place to which they are to fly; and lest they should take a fancy to stop by the way to drink or to wash themselves, their feet are dipped at their departure in vinegar. The Soland geese in St. Kilda, steal, as

Such is the language of a man who by long study became enamoured of his subject; but to those who judge less partially, it will be found that the insect tribe, for every reason, deserve but the last and lowest rank in animated nature. As in mechanics the most complicated machines are required to perform the nicest operations, so in anatomy the noblest animals are most variously and wonderfully made.* Of all living beings, man offers the most wonderful variety

Martin informs us, the grass out of one another's nests, not for the sake of stealing, but because they pick up grass wherever they find it, to form a soft depository for their eggs: and as these geese live together in flocks of many thousands, they find it every where in the nests of their companions. Highly as Ulloa extols the almost human caution and intelligence manifested by the mules in America in descending the lofty mountains, yet a closer examination will show that it is nothing but the fear of falling at the sight of the precipices, which occasions all their caution, without any farther consideration. If at Lima they stand with their legs wide apart when they hear a subterraneous rumbling, this proves nothing more than an habitual mechanical action acquired by frequent repetition, because when the earth shakes, they are obliged to assume a firmer position with their burdens, and they take the noise and the earthquake for one and the same thing, since the one invariably accompanies the other. Such is the real history of the supposed intelligence and cunning of animals. Nature must have known how far it was necessary for the skill which she conferred on animal bodies to extend, in order to the attainment of the purposes of self-preservation, self-defence, and the propagation of their kind. So much is certain, that all these instincts have their appointed limits, beyond which no animal can go; and hence it is, that the animals, so long as they follow their instincts, perform actions of apparently astonishing intelligence, but in other respects are so stupid as not to manifest the slightest trace of cunning in their operations. A hen, whose providence and perseverance we admire, when she lays her eggs in some sequestered spot, where she sits on and turns them, and almost sacrifices herself in her attention to them, bestows the same pains on a lump of chalk which is put under her. She leads her chickens about that they may learn to scratch up the ground and to seek worms and insects. At the same time she will tread upon one of them, and affrighted at the cries which the pain extorts from it, she clucks to warn and to soothe it; but yet she has not the sense to raise her foot and to set it at liberty. A lobster will, with inconceivable dexterity, snap off his leg when one of his fellows seizes it with his claw: but if you put one of his legs between his own claw, he will not have the sense to open his claw and to remove his leg, but breaks it off, as if there was no other method of releasing himself. The ostrich hatches her eggs, as it would appear, for the purpose of having young ostriches; she nevertheless quits them for every trifle, and leaves them to perish; nay, she will even break most of them herself, for the purpose of feeding with them the young ones which she already has.—This bird has, moreover, the silly instinct to swallow every thing that comes in its way, without discriminating, like other animals, whether it is hurtful to it or not. An ostrich swallowed, in Shaw's presence, several leaden bullets hot from the mould. It will greedily devour its own excrements and those of other birds, and of course manifests not the least choice in obeying the instinct of appetite. The crocodile would multiply with dangerous rapidity, were it not so stupid as to devour its own young, according to the testimony of Ulloa. Thus, too, the male tiger destroys its own species in its young; and it is observed of one of the bug family, that the female is obliged to use the greatest precaution to defend her eggs and her young from the male. The ascent and descent of larks are the result of an instinct implanted in those birds, which they follow without any consideration; for they do the very same over the sea as upon land, and hence frequently perish in the water. A thousand other examples of this kind might be adduced. They prove that these actions, which seem to manifest so much intelligence, are but the actions of a machine, adapted to certain particular purposes, and that to those purposes alone this apparent intelligence extends —NEW MONTHLY MAGAZINE.

* INSECT HISTORY FASCINATING TO YOUTH.—If the bias of opening curiosity be properly directed, there is not any branch of natural history so fascinating to youth as the study of insects. It is, indeed, a common practice in many families, to teach children, from the earliest infancy, to treat the greater number of insects as if they were venomous and dangerous, and, of course, meriting to be destroyed, or, at least, avoided with horror. Associations are by this means linked with the very appearance of insects, which become gradually more inveterate with advancing years; provided, as most frequently happens, the same system be persisted in, of avoiding or destroying almost every insect which is unlucky enough to attract observation. How much rational amusement and innocent pleasure is thus thoughtlessly lost; and how

in his internal conformation; quadrupeds come next; and other animals follow in proportion to their powers or their excellences. Insects seem of all others the most imperfectly formed: from their minuteness, the dissecting knife can go but a short way in the investigation; but one thing argues an evident imperfection, which is, that many of them can live a long time, though deprived of those organs which are necessary to life in the higher ranks of nature. Many of them are furnished with lungs and a heart like nobler animals; yet the caterpillar continues to live, though its heart and lungs, which is often the case, are entirely eaten away.

If insects be considered as bearing a relation to man, and as assisting him in the pleasures or necessities of life, they will, even in this respect, sink in the comparison with the larger tribes of nature. It is true, that the bee, the silkworm, the cochineal fly, and the cantharides, render him signal services; but how many others of this class are either noxious, or totally unserviceable to him.*

Their amazing number is also an argument of their imperfection. It is a rule that obtains through all nature, that the nobler animals are slowly produced, and that nature acts with a kind of dignified economy; but the meaner births are lavished in profusion, and thousands are brought forth merely to supply the necessities of the more favourite objects of creation. Of all other productions in nature, insects are the most numerous.†

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many disagreeable feelings are thus created, in the most absurd manner! "In order to show," says a writer in the *Magazine of Natural History*, "that the study, or (if the word be disliked) the observation of insects is peculiarly fascinating to children, even in their early infancy, we may refer to what we have seen in the family of a friend, who is partial to this, as well as to all the departments of natural history. Our friend's children, a boy and a girl, were taught, from the moment they could distinguish insects, to treat them as objects of interest and curiosity, and not to be afraid even of those which wore the most repulsive appearance. The little girl, for example, when just beginning to walk alone, encountered one day a large staphylinus (*Goerius olens*? Stephens; vulgo, *the devil's coach-horse*), which she fearlessly seized, and did not quit her hold, though the insect grasped one of her fingers in his formidable jaws. The mother, who was by, knew enough of the insect to be rather alarmed for the consequences, though she prudently concealed her feelings from the child. She did well; for the insect was not strong enough to break the skin, and the child took no notice of its attempts to bite her finger. A whole series of disagreeable associations with this formidable-looking family of insects was thus averted, at the very moment when a different mode of acting on the part of the mother would have produced the contrary effect. For more than two years after this occurrence, the little girl and her brother assisted in adding numerous specimens to their father's collection, without the parents ever having had cause, from any accident, to repent of their employing themselves in this manner. The sequel of the little girl's history strikingly illustrates the position for which we contend. The child happened to be sent to a relative in the country, where she was not long in having carefully instilled into her mind all the usual antipathies against 'every thing that creepeth on the earth;' and though she afterwards returned to her paternal home, no persuasion nor remonstrance could ever again persuade her to touch a common beetle, much less a staphylinus, with its tail turned up in a threatening attitude, and its formidable jaws ready extended for attack or defence." We do not wish that children should be encouraged to expose themselves to danger, in their encounters with insects. They should be taught to avoid those few which are really noxious—to admire all—to injure none. —INSECT ARCHITECTURE.

* ANECDOTE.—The study of insects may, or may not, be of importance; but a little incident deserves to be recorded from the consequences which resulted from a devotion to this study.—Quartremère d'Isjouval was a state prisoner in Holland in the latter part of 1794, when the French army under Pichegru invaded that country. He found means to carry on a correspondence with the French general, and, having carefully watched the operations of his spiders, he wrote to Pichegru that he was here; and from his observations upon the spiders, that a severe winter was at hand, which would, of course, facilitate the operations of the invading army. The French general, who had already thought of retreating, acted upon this hint, and in a few days after took possession of the whole country, which would have been inaccessible to him had it not been for the ice, which was soon sufficiently strong to allow the French army to cross the rivers.—ED.

† STUDY OF INSECTS.—It has been objected to the study of insects, as well as to that of Natural History in general, that it tends to withdraw the mind from subjects of higher

In this class of animals there are numerous distinctions, and a general description will by no means serve for all. Almost every species has its own distinct history; and exhibits manners, appetites, and modes of propagation, peculiarly its own.* In the larger ranks of existence, two animals that nearly resemble each other in form will be found to have a similar history; but here insects almost entirely alike will be often found perfectly dissimilar, as well in their manner of bringing forth and subsisting, as in the changes which they undergo during their short lives. Thus, as this class is prolific beyond computation, so are its varieties multiplied beyond the power of description.†

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moment; that it cramps and narrows the range of thought; and that it destroys, or at least weakens, the finer creations of the fancy. Now, we should allow this objection in its fullest extent, and even be disposed to carry it further than is usually done, if the collecting of specimens only, or, as the French expressively call them, chips (*échantillons*), be called a study. But the mere collector is not, and cannot be, justly considered as a naturalist; and, taking the term naturalist in its enlarged sense, we can adduce some distinguished instances in opposition to the objection. Rousseau, for example, was passionately fond of the Linnæan botany, even to the driest minutiæ of its technicalities; and yet it does not appear to have cramped his mind, or impoverished his imagination. If Rousseau, however, be objected to as an eccentric being, from whose pursuits no fair inference can be drawn, we give the illustrious example of Charles James Fox, and may add the names of our distinguished poets, Goldsmith, Thomson, Gray, and Darwin, who were all enthusiastic naturalists. We wish particularly to insist upon the example of Gray, because he was very partial to the study of insects. It may be new to many of our readers, who are familiar with the Elegy in a Country Churchyard, to be told that its author was at the pains to turn the characteristics of the Linnæan orders of insects into Latin hexameters, the manuscript of which is still preserved in his interleaved copy of the "Systema Naturæ." Further, to use the somewhat exaggerated words of Kirby and Spence, whose work on Entomology is one of the most instructive and pleasing books on the science, "Aristotle among the Greeks, and Pliny the Elder among the Romans, may be denominated the fathers of Natural History, as well as the greatest philosophers of their day; yet both these made insects a principal object of their attention: and in more recent times, if we look abroad, what names greater than those of Redi, Malpighi, Vallisnieri, Swammerdam, Leeuwenhoek, Réaumur, Linnæus, De Geer, Bonnet, and the Hubers? and at home, what philosophers have done more honour to their country and to human nature than Ray, Willoughby, Lister, and Derham? Yet all these made the study of insects one of their most favourite pursuits."—INSECT ARCHITECTURE.

* ON THE SEXUAL INSTINCT OF INSECTS.—It has been asserted, that the circuitous flight of the butterfly tribe arises from one sex pursuing through the air the track of the other; and that, if an unimpregnated female of the *Phalæna quercus* (egger moth) be carried in a gauze cage into the haunts of that species, numbers of the males will be attracted, so as to be easily captured. I have never had an opportunity of verifying this fact; but, from a circumstance which occurred to me during the past year, I have no doubt of its correctness.

I was engaged in rearing lepidopterous insects from the larvæ, and had a great variety of the pupæ of different species. One evening, I found a female *Sphinx ocellata* just emerged, which, in lifting from the floor, ran up my arm and round the collar of my coat: two hours after, on returning to my study from shutting some glass frames in the garden, a very fine male of the same species was fluttering on my shoulder, where the female had previously crawled. But a still more curious fact, which must appear almost incredible, remains to be stated. Two females of the sphinx populi were evolved. The next day I found three males in the room. As no one had entered it in the interval, nor was there apparently any mode by which they could gain access, I was somewhat puzzled to account for their appearance. The same evening, however, the mode of entrance was made apparent, by two more males, of the same species, coming down the chimney; one of which fell into a vase standing on the fire-place, where I captured it before it could extricate itself. Afterwards, upon occasion of the evolution from the pupa state of females of the *Phalæna bucephala* and *Phalæna salicis*, the windows of my study were completely besieged by males of the same species, which, upon throwing open the windows, eagerly rushed in.—CORRESPONDENT OF BRANDE'S JOURNAL.

† FECUNDITY OF THE ANIMAL KINGDOM; PARTICULARLY INSECTS. — A single plant-louse (*Aphis*) may be the living progenitor of 5,904,900,000 descendants, and the queen of the warrior white ants (*Termes bellicosus*, Smeathm.), produces 31,536,000 eggs in one year.

We may illustrate this subject by an extract exemplifying the proportionate fecundity

Swammerdam, Reaumer, and Linnæus, have each attempted to abridge the task of description, by throwing a number of similar animals into distinct classes, and thus making one general history stand for all. I will avail myself of their labours; and uniting their general distinctions, throw the whole class of insects into four separate distributions, giving under each the history of every species that seems to me considerable enough to deserve our notice.

In our cursory inspection of the insect tribe, the first animals that offer themselves are those which want wings, that appear crawling about on every plant, and on every spot of earth we regard with any degree of attention. Of these, some never obtain wings at any period of their existence, but are destined to creep on the vegetable, or the spot of earth where they are stationed, for their whole lives. On the contrary, others are only candidates for a more happy situation; and only wait their growing wings, when they may be said to arrive at their state of full perfection.

Those that never have wings, but creep about till they die, may be considered as constituting the *first* class of insects.

The second order of insects consists of such as have wings; but which, when produced from the egg, have those wings cased up in such a manner as not to appear.

The third order of insects is of the moth and butterfly kind. These all have four wings, each covered with a mealy substance of various colours, which, when handled, comes off upon the fingers; and, if examined by the microscope, will appear like scales, with which the wing is nicely embroidered all over.

The fourth order is of those winged insects which come from a worm instead

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of the animal kingdom in general "Compared with the rest of animated nature," says Dalyell, "infusion animalcula are surely the most numerous: next are worms, insects, or fishes; amphibia and serpents, birds, quadrupeds; and last is man. The human female produces only one at a time, that after a considerable interval from birth, and but few during her whole existence. Many quadrupeds are subject to similar laws; some are more fertile, and their fecundity is little, if at all, inferior to that of certain birds, for they will produce ten or twenty at once. Several birds will breed frequently in a year, and have more than a single egg at a time. How prodigious is the difference, on descending to fishes, amphibia, reptiles, insects, and worms! Yet among them the numbers cannot be more different. According to naturalists, a scorpion will produce sixty-five young; a common fly will lay 144 eggs; a leech, 150; and a spider, 170. I have seen a hydrachna produce 600 eggs, and a female moth 1,100. A tortoise, it is said, will lay 1,000 eggs, and a frog 1,100. A gall insect has laid 5,000 eggs; a shrimp 6,000; and 10,000 have been found in the ovary, or what is supposed to be that part, of an ascarides. One naturalist found above 12,000 eggs in a lobster, and another above 21,000 An insect very similar to an ant (*Mutilla ?*) has produced 80,000 in a single day; and Leeuwenhoeck seems to compute four millions in a crab. Many fishes, and those which in some countries seldom occur, produce incredible numbers of eggs. Above 36,000 have been counted in a herring; 38,000 in a smelt; 1,000,000 in a sole; 1,130,000 in a roach; 3,000,000 in a species of sturgeon; 342,000 in a carp; 383,000 in a tench; 546,000 in a mackerel; 992,000 in a perch; and 1,357,000 in a flounder. But of all fishes hitherto discovered, the cod seems the most fertile. One naturalist computes that it produces more than 3,686,000 eggs; another 9,000,000; and a third 9,444,000. Here, then, are eleven fishes, which, probably, in the course of one season, will produce above thirteen millions of eggs; which is a number so astonishing and immense, that, without demonstration, we could never believe it true."

The fecundity of insects is no less remarkable than that of fishes. In some instances, particularly in those already mentioned, the numbers produced from the eggs of a single female, far exceed the progeny of any other class of animals. It is this extraordinary fecundity which, under favourable circumstances, produces countless swarms of insects that give origin to the opinion of their being spontaneously generated by putrefaction, or brought in some mysterious way by blighting winds. The numerous accidents, however, to which insects are exposed from the deposition of the egg till their final transformation, tend to keep their numbers from becoming excessive, or to reduce them when they are at any time more than commonly numerous.—INSECT TRANSFORMATIONS.

of a caterpillar, and yet go through changes similar to those which moths and butterflies are seen to undergo. In this class we may place the numerous tribes of gnats, beetles, bees, and flies.

Having thus given a general distribution of insects, I will proceed to describe each class in the order I have mentioned them; beginning with insects without wings, as they more nearly resemble the higher ranks of nature, as well in their habits as their conformation.*

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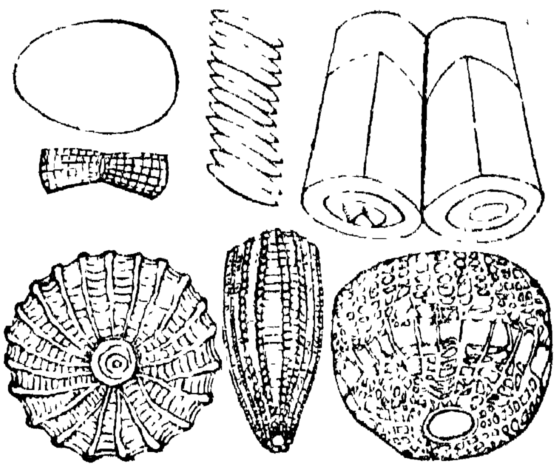
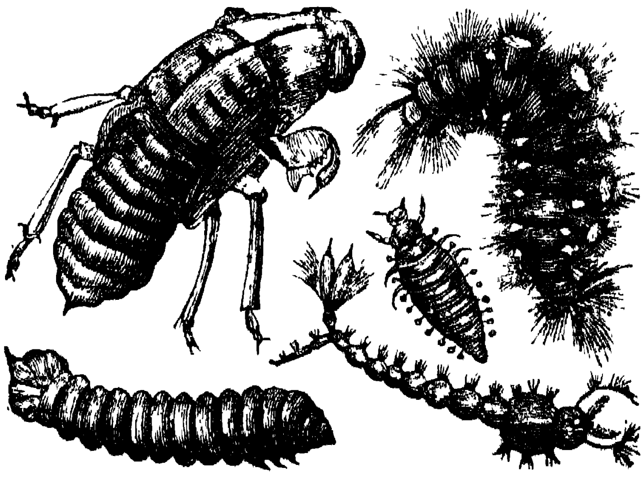
* **Introduction to the Study of Insects.**—To assist the reader in estimating the wonders of this part of the animal kingdom, it may be useful to insert here a brief description of the changes which insects undergo, with correct illustrations, which will prevent much misconception and confusion in what follows.

Eggs of Insects.—It was of old believed that insects were produced spontaneously by putrefying substances; and Virgil gives the details of a process for *creating* a swarm of bees out of the carcass of a bull: but Redi, a celebrated Italian naturalist, proved by rigid experiments that they are always, in such cases, hatched from *eggs* previously laid. Most insects, indeed, lay eggs, though some few are viviparous, and some, like serpents, propagate both ways. The eggs of insects are very various in form, and seldom shaped like those of birds. We have figured those of several species, as they appear under the microscope.



(Eggs of Insects.)

Larvæ of Insects.—When an insect first issues from the egg, it is called by naturalists *larva*, and, popularly, a caterpillar, a grub, or a maggot. The distinction, in popular language, seems to be, that *caterpillars* are produced from the eggs of moths or butterflies; *grubs*, from the eggs of beetles, bees, wasps, &c.; and *maggots* (which are without feet) from blow-flies, house-flies, cheese-flies, &c., though this is not very rigidly adhered to in common parlance. Maggots are also sometimes called *worms*, as in the instance of the meal-worm; but the common earth-worm is not a larva, nor is it by modern naturalists ranked among insects.



(Larvæ, Grubs, &c.)

Larvæ are remarkably small at first, but grow rapidly. The full-grown caterpillar of the goat-moth (*Cossus ligniperda*) is thus seventy-two thousand times heavier than when it issues from the egg; and the maggot of the blow-fly is, in twenty-four hours, one hundred and fifty-five times heavier than at its birth. Some larvæ have feet, others are without: none have wings. They cannot propagate. They feed voraciously on coarse substances; and as they increase in size, which they do very rapidly, they cast their skins three or four times. In defending themselves from injury, and in preparing for their change by the construction of secure abodes, they manifest great ingenuity and mechanical skill. The figures exemplify various forms of insects in this stage of their existence.

Pupæ of Insects.—When larvæ are full grown, they cast their skins for the last time, undergo a complete change of form, and, with a few exceptions, cease to eat, and remain nearly motionless. When an insect, after this change, does not lose its legs, or continues to eat and move, it is popularly

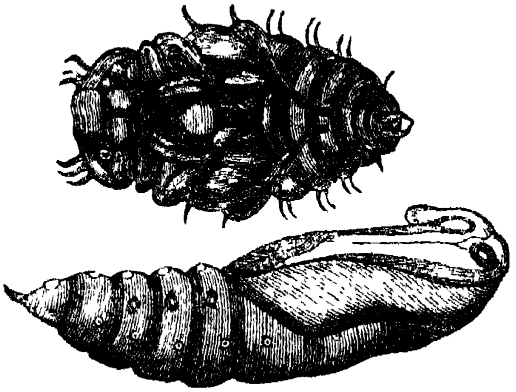
CHAP. II.

INSECTS WITHOUT WINGS.

Every moment's observation furnishes us with instances of insects without wings; but the difficulty is to distinguish those which are condemned continually to lead reptile lives, from such as only wait the happy moment of transmutation. For this, nothing but a long and intimate acquaintance will suffice; but, in general, all animals resembling the flea, the louse, the spider, the bug, the wood-louse, the water-louse, and the scorpion, never acquire wings, but are produced from the egg in that form which they never change afterwards.

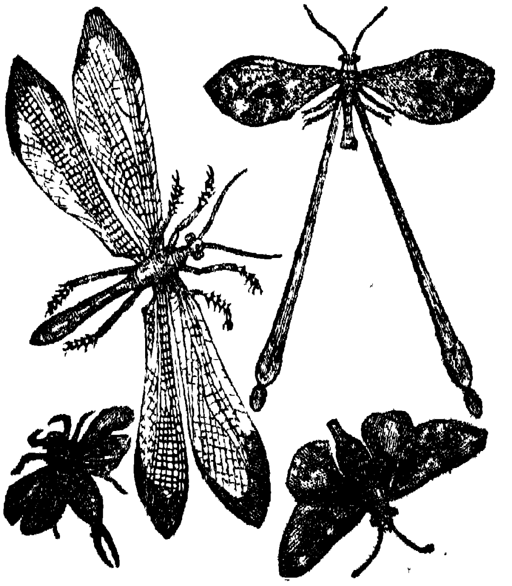
If we consider this class as distinct from others, we shall find them in general longer lived than the rest, and often continuing their term beyond one season, which is the ordinary period of an insect's existence.

They come to perfection in the egg, as was said before; and it sometimes happens, that when the animal is interrupted in performing the offices of exclusion, the young ones burst the shell within the parent's body, and are thus called a *Nymph;* and when the inner skin of the larva is converted into a membranous or leathery covering, which wraps the insect closely up like a mummy, it is termed *Pupa*, from its resemblance to an infant in swaddling bands. From the pupæ of many of the butterflies appearing gilt as if with gold, the Greeks called them *Chrysalides*, and the Romans *Aureliæ*, and hence naturalists frequently call a pupa, *chrysalis*, even when it is not gilt. We shall see, as we proceed, the curious contrivances resorted to for protecting insects in this helpless state.



(Pupæ, or Chrysalides.)

Perfect Insects.—After a certain time, the insect which has remained in its pupa-case, like a mass of jelly without shape, is gradually preparing for its final change, when it takes the form of a perfect insect. This state was called by Linnæus, *Imago*, because the insect, having thrown off its mask, becomes a perfect *image* of its species. Of some, this last portion of their existence is very short, others live through a year, and some exist for longer periods. They feed lightly, and never increase in size. The chief object of all is to perpetuate their species, after which the greater number quickly die. It is in this state that they exercise those remarkable instincts for the preservation of their race, which are exhibited in their preparations for the shelter of their eggs, and the nourishment of their larvæ. The foregoing are examples of insects in the *imago*, or perfect state.—**Insect Architecture.**



(Insects in the Imago, or perfect state.)

brought forth alive.* This not unfrequently happens with the wood-louse, and others of the kind, which are sometimes seen producing eggs, and sometimes young ones perfectly formed.

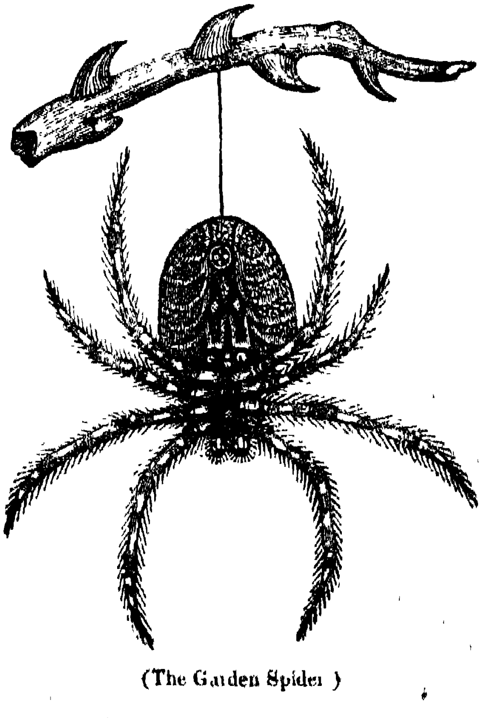
Though these creatures are perfect from the beginning, yet they are often, during their existence, seen to change their skin: this is a faculty which they possess in common with many of the higher ranks of animals, and which answers the same purposes. However tender their skins may seem to our feel, yet, if compared to the animal's strength and size, they will be found to resemble a coat of mail, or, to talk more closely, the shell of a lobster. By this skin these animals are defended from accidental injuries, and particularly from the attacks of each other. Within this they continue to grow, till their bodies become so large as to be imprisoned in their own covering, and then the shell bursts, but is quickly replaced by a new one.

Lastly, these animals are endued with a degree of strength for their size, that at first might exceed credibility.—Had man an equal degree of strength, bulk for bulk, with a louse or flea, the history of Samson would be no longer miraculous.—A flea will draw a chain a hundred times heavier than itself; and to compensate for this force, will eat ten times its own size of provision in a single day.

CHAP. III.

THE SPIDER AND ITS VARIETIES

The animal that deserves our first notice in this principal order of insects, is the spider, whose manners are of all others the most subtle, and whose instincts are most various.



(The Garden Spider.)

In this country, where all the insect tribes are kept under by human assiduity, the spiders are but small and harmless. We are acquainted with few but the house-spider, which weaves its web in neglected rooms; the garden-spider, that spreads its toils from tree to tree, and rests in the centre; the wandering-spider, that has no abode like the rest; and the field-spider, that is sometimes seen mounting, web and all, into the clouds. These are the chief of our native spiders; which, though reputed venomous, are entirely inoffensive. But they form a much more terrible tribe in Africa and America. In those regions, where all the insect species acquire their greatest growth, where the butterfly is seen to expand a wing as broad as our sparrow, and the ant to build a habitation as tall as a man, it is not to be wondered at that the spiders are seen bearing a propor tionable magnitude. In fact, the bottom of the Martinico spider's body is as large as a hen's egg, and covered all over with hair. Its web is strong, and its bite dangerous. It is happy for us, however, that we are placed at a distance from these formidable creatures, and that we can examine their history without feeling their resentment.

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* Male Insects Hatched First.—Naturalists have observed that the male broods of insects invariably appear earlier than the female broods. Professor Rennie notices,

Every spider has two divisions in its body. The fore part, containing the head and breast, is separated from the hinder part, or belly, by a very slender thread, through which, however, there is communication from one part to the other. The fore part is covered with a hard shell, as well as the legs, which adhere to the breast. The hinder part is clothed with a supple skin, beset all over with hair. They have several eyes all round the head, brilliant and acute; these are sometimes eight in number, sometimes but six; two behind, two before, and the rest on each side. Like all other insects, their eyes are immovable; and they want eyelids; but this organ is fortified with a transparent, horny substance, which at once secures and assists their vision. As the animal procures its subsistence by the most watchful attention, so large a number of eyes was necessary to give it the earliest information of the capture of its prey. They have two pincers on the fore part of the head, rough, with strong points, toothed like a saw, and terminating in claws like those of a cat. A little below the point of the claw there is a small hole, through which the animal emits a poison, which, though harmless to us, is sufficiently capable of instantly destroying its prey. This is the most powerful weapon they have against their enemies; they can open or extend these pincers as occasion may require; and when they are undisturbed, they suffer them to lie one upon the other, never opening them but when there is a necessity for their exertion. They have all eight legs, jointed like those of lobsters, and similar also in another respect; for if a leg be torn away, or a joint cut off, a new one will quickly grow in its place, and the animal will find itself fitted for combat as before. At the end of each leg there are three, crooked, movable claws; namely, a small one, placed higher up, like a cock's spur, by the assistance of which it adheres to the threads of its web. There are two others larger, which meet together like a lobster's claw, by which they can catch hold of the smallest depressions, walking up or down the very polished surfaces, on which they can find inequalities that are imperceptible to our grosser sight.

The spider, though thus formidably equipped, would seldom prove successful in the capture, were it not equally furnished with other instruments to assist its depredations. As it lives wholly upon flies, and is without wings to pursue them, it is obvious they must for ever escape so impotent an adversary; but the spider is a most experienced hunter, and spreads its nets to catch those animals it is unable to pursue. The spider's web is generally laid in those places where flies are most apt to come and shelter; in the corners of rooms, round the edges of windows, and in the open air among the branches of trees. There the little animal remains for days, nay weeks together, in patient expectation, seldom changing its situation, though never so unsuccessful.

For the purposes of making this web, nature has supplied this animal with a large quantity of glutinous matter within its body, and five dugs, or teats, for spinning it into thread.* This substance is contained in a little bag, and at first sight it resembles soft glue; but when examined more accurately, it will be found twisted into many coils of an agate colour, and upon breaking it, the

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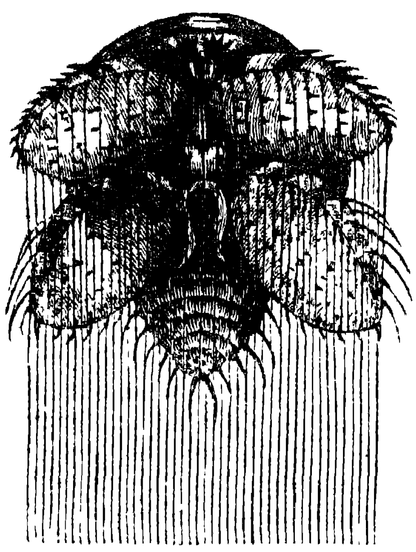
that upon the leaf of a poplar tree, of three eggs of the puss moth, (*cerura vinula*,) which he found, two were hatched about a fortnight before the other. The first were males, and the last a female; thus distinctly proving, that eggs from which females are produced are longer of hatching. As they were found on the same leaf, they were of course presumed to be laid by the same parent; at the same time, the difference in the time of hatching could not depend upon any atmospherical cause.—NAT. HIST. OF SELBORNE.

* THREAD AND SPINNERETS OF A SPIDER.—Leeuwenhoeck, in one of his extraordinary microscopical observations on a young spider not bigger than a grain of sand, upon enumerating the threadlets in one of its threads, calculated that it would require four millions of them to be as thick as a hair of his beard.—INSECT ARCHITECTURE.

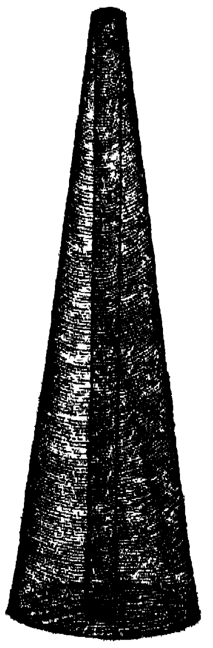
contents may be easily drawn out into threads, from the tenacity of the substance, not from those threads being already formed. Those who have seen the machine by which wire is spun, will have an idea of the manner in which this animal forms the threads of its little net, the orifices of the five teats above mentioned, through which the thread is drawn, contracting or dilating at pleasure. The threads which we see, and appear so fine, are, notwithstanding, composed of five joined together, and these are many times doubled when the web is in formation.



(Thread and Spinnerets of a Spider.)

When a house-spider proposes to begin a web, it first makes choice of some commodious spot, where there is an appearance of plunder and security. The animal then distils one little drop of its glutinous liquor which is very tenacious, and then creeping up the wall, and joining its thread as it proceeds, it darts itself in a very surprising manner, as I have often seen, to the opposite place, where the other end of the web is to be fastened. The first thread thus formed, drawn tight, and fixed at each end, the spider then runs upon it backward and forward, still assiduously employed in doubling and strengthening it, as upon its force depends the strength and stability of the whole. The scaffolding thus completed, the spider makes a number of threads parallel to the first, in the same manner, and then crosses them with others; the clammy substance of which they are formed serving to bind them, when newly made, to each other.

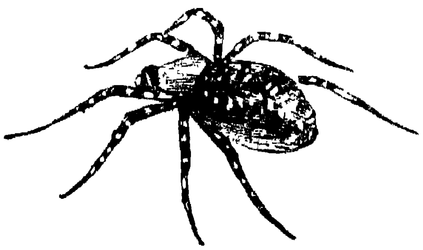
The insect after this operation, doubles and trebles the thread that borders its web, by opening all its teats at once, and secures the edges, so as to prevent the wind from blowing the work away. The edges being thus fortified, the retreat is next to be attended to; and this is formed like a funnel at the bottom of the web, where the little creature lies concealed. To this are two passages, or outlets, one above, and the other below, very artfully contrived, to give the animal an opportunity of making excursions at proper seasons, of prying into every corner, and cleaning those parts which are observed to be clogged or incumbered. Still attentive to its web, the spider, from time to time, cleans away the dust that gathers round it, which might otherwise clog and incommode it: for this purpose, it gives the whole a shake with its paws; still, however, proportioning the blow so as not to endanger the fabric. It often happens also, that from the main web there are several threads extended at some distance on every side: these are, in some measure, the outworks of the fortification, which, whenever touched from without, the spider prepares for attack or self-defence. If the insect impinging be a fly, it springs forward with great agility; if, on the contrary, it be the assault of an enemy stronger than itself, it keeps within its fortress, and never ventures out till the danger be over. Another advantage which the spider reaps from this contrivance of a cell or retreat behind the web is, that it serves for a place where the creature can feast upon its game with all safety, and conceal the fragments of those carcasses which it has picked, without exposing to public view the



(The Spider's Web.)

least trace of barbarity, that might create a suspicion in any insects that their enemy was near.*

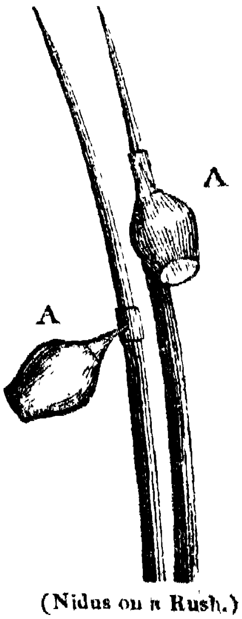
It often happens, however, that the wind, or the rustling of the branches, or the approach of some large animal, destroys in a minute the labours of an age. In this case, the spider is obliged to remain a patient spectator of the universal ruin; and when the danger is passed away, it sets about repairing the calamity. For this purpose, it is furnished with a large store of the glutinous substance of which the web is made; and with this, it either makes a new web, or patches up the old one. In general, however, the animal is much fonder of mending than making, as it is furnished originally with but a certain quantity of glutinous matter, which, when exhausted, nothing can renew. The time seldom fails to come, when their reservoirs are entirely dried up, and the poor animal is left to all the chances of irretrievable necessity. An old spider is thus frequently reduced to the greatest extremity; its web is destroyed, and it wants the materials to make a new one. But as these animals have been long accustomed to a life of shifting, it hunts about to find out the web of another spider, younger and weaker than itself, with whom it ventures a battle. The invader generally succeeds; the young one is driven out to make a new web, and the old one remains in quiet possession. If, however, the spider is unable to dispossess any other of its web, it then endeavours, for awhile, to subsist upon accidental depredation; but in two or three months it inevitably dies of hunger.



It has been the opinion of some philosophers, that the spider was in itself both male and female; but Lister has been able to distinguish the sexes, and to perceive that the males were much less in size than the females.

The female generally lays from nine hundred to a thousand eggs in a season; they are of a bluish colour, speckled with black, and separated from each other by a glutinous substance, not unlike frog spawn water.

When the number of eggs which the spider has brought forth have remained for an hour or two to dry after exclusion, the little animal then prepares to make them a bag, where they are to be hatched until they leave the shell. For this purpose, she spins a web four or five times stronger than that made for catching flies; and, besides, lines it within side by a down, which she plucks from her own breast. This bag, when completed, is as thick as paper, is smooth within side, but rougher without. Within this they deposit their eggs; and it is almost incredible to relate the concern and industry which they bestow in the preservation of it. They stick it by means of their glutinous fluid to the end of their body; so that the animal, when thus loaded, appears as if she had one body placed behind another. If this bag be separated from her by any accident, she employs all her assiduity to stick it again in its former situation, and seldom abandons her treasure but with her life. When the young ones are excluded from their shells, within the bag, they remain for some time in their confinement, until the female, instinctively knowing their maturity, bites open their prison, and sets them free. But her parental care does not terminate with their exclusion; she receives them upon her back for some time,



(Nidus on a Rush.)

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* Spider's Web.—The annexed cut illustrates the fabric constructed by some species of spider (mygale avicularia). It was discovered in the Brazils, in the hedges, a few

until they have strength to provide for themselves, when they leave her never to return, and each begin a separate manufactory of its own.* The young ones begin to spin when they can scarcely be discerned; and prepare for a life of plunder before they have strength to overcome. Indeed, nature seems to have formed them in every respect for a life of hostility. No other insect is possessed of such various powers of assault and defence; and they are able to destroy animals ten times bigger than themselves. Even after a severe defeat, they quickly recover of their wounds; and as for their legs, they consider the loss of them as but a small misfortune, as they grow again very speedily to their former magnitude.

Thus there is no insect to which they are not an enemy; but what is more barbarous still, spiders are the enemies of each other. Reaumur, who was fond of making experiments upon insects, tried to turn the labours of the spider to human advantage, and actually made a pair of gloves from their webs. For this purpose, he collected a large number of those insects together: he took care to have them constantly supplied with flies, and the ends of young feathers, fresh picked from chickens and pigeons, which being full of blood, are a diet that spiders are particularly fond of. But notwithstanding all his care, he was soon convinced that it was impracticable to rear them, since they were of such a malignant nature, that they could never be brought to live in society; but instead of their usual food, chose to devour each other.†

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miles from Rio Janeiro, on the road to the gold mines of Tejuco. The structure was trumpet shaped, perfectly circular, and three feet in length. A cylindrical gallery, two inches in diameter, traversed this truncated cone from end to end, and preserved its central position by lateral lines of attachment in the form of radii converging toward the central orifice at the greater end of the web, which was 10 inches in diameter.—J. MURRAY, IN MAG. NAT. HIST.

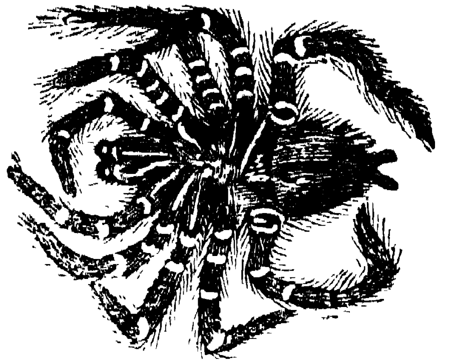
Dr Walsh describes a species of spider in Brazil, whose web extends, as thick and tenacious as a veil of gauze, and extending like a canopy from tree to tree. One of these webs he saw covered with large spiders, with yellow spotted bodies, and shining polished legs, nearly as large as those of a small crab: they were all of different sizes and ages, and the colony consists of above one hundred insects, young and old, who all seemed to live together in peace and good will.

* NIDUS ON A RUSH.—The annexed cut represents a nidus or nest attached to a rush; the nest in the figure being half its natural size. I discovered it whilst botanizing in the early part of the summer, and so closely does it resemble a flower, that I mistook it for one, even after it was in my hand. It is perfectly white, and of manufacture the most finished. The lower end is quite flat, with edges as sharp in proportion as those of the crown of a hat, which I consider a great peculiarity, as I cannot recollect any insect manufacture of a web-like material, whether nidus of spider, or cocoon of caterpillar, except such as are round or oval, and certainly none with sharp edges such as I describe. As I found two of them, I cut one open, and found about a dozen eggs sticking to the base at A, but not occupying one-tenth of the interior.—MAG. NAT. HIST No. 6.

De Geer has given, in detail, an account of some similar ones that he met with both in Holland and Sweden. The first he observed were suspended in a hay chamber, and he noticed others afterwards in similar places. He describes them as composed of silk of a dirty white, in the form of little oval bags, suspended by a slender but strong thread. They were nearly of the shape of hens' eggs, and were so thin that the eggs they contained might be seen through them When the eggs hatched, they produced a spider, which he names aránea tuberculàta. He afterwards found, suspended to stalks of grass, &c. other nests, more nearly resembling those figured above, which he describes as of the size of a small pea, of the shape of a bottle, with the bottom flat, containing about a dozen eggs, which also produced spiders. Most probably, the nidus described contained the eggs of some spider frequenting the water—IBID. No. 9.

† SILK FROM SPIDERS.—At the last anniversary of the Society of Arts, the silver ISIS medal was presented to Mr. D. B. Rolt for obtaining silk from the garden spider. We find the details in the volume of the society's transactions lately published.

"The subject of Mr. Rolt's experiments has been the garden spider (*aranea diadema*), the webs of which, in autumn, are so conspicuous on the surface of shrubs and in other similar situations. On allowing one of these animals to crawl over his hand, he found that it drew a thread with it wherever it went: he likewise, without any difficulty, wound some of this thread over his hand, finding that the spider continued spinning while the thread was winding up.



(The Great Am[illegible] Spider)

Of this animal there are several kinds, slightly differing from each other, either in habits or conformation.* The water-spider is the most remarkable of the number. This insect resembles the common spider in its appearance, except that its hinder part is made rather in the shape of a nine-pin than a ball. They differ in being able to live as well by land as water; and in being capable of spinning as well in one element as the other. Their appearance under water is very remarkable; for though they inhabit the bottom, yet they are never touched by the element in which they reside, but are inclosed in a bubble of air that, like a box, surrounds them on every side. This bubble has the bright appearance, at the bottom, of quicksilver; and within this, they perform their several functions of eating, spinning, and sleeping, without its ever bursting, or in the least disturbing their operations: sometimes, the bubble is seen divided into three distinct apartments; and in the spring, the male enters one of those

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"On this hint, he connected a small reel with the steam-engine of the factory in which he is occupied, and putting it in motion, at the rate of 150 feet per minute, found that the spider would thus continue to afford an unbroken thread during from three to five minutes. The specimen of this silk, which accompanies Mr. Rolt's communication, was wound off from twenty-four spiders in about two hours. Mr. R. estimates its length at 18,000 feet: its colour is white, and its lustre is brilliant, and completely metallic, owing, probably, to its great opacity. No attempt has been made by him to combine two or more filaments into one by winding, nor, of course, to form it into thread by throwing.

"The thread of the garden spider is so much finer than that of the silk-worm, that the united strength of five of the former is, according to Mr. Rolt, equal only to one of the latter; and, assuming that the weight is in proportion to the strength, and that a spider will yield twice a year a thread 750 feet long, while that produced by a single silk-worm is 1,900 feet, it follows that the produce of one silk-worm is equal to that of 6·3 spiders. Now, as on an average it takes about 3,500 silk-worms to produce a pound of silk, it would take about 22,000 spiders to produce an equal quantity. Besides, spiders are not so easily confined as silk-worms, and whenever two come in contact, a battle ensues, which ends in the destruction of the weaker one. Spiders kept for silk must, therefore, be each in separate dens or cells; and the apparatus contrived by Mr. Rolt for this purpose, although very ingenious and well adapted to carry on a course of experiments with a hundred or two, would manifestly be wholly inapplicable to any purpose of commercial utility. Mr. Rolt has, however, made some interesting additions to the history of the garden spider, and has obtained the silk in its natural state, exhibiting all its peculiar lustre; his method, likewise, of winding the silk directly from the animal is, to say the least of it, effectual and ingenious."

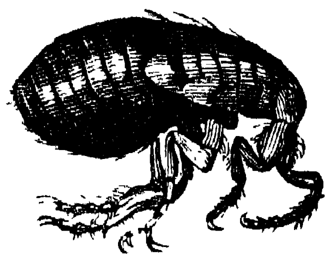
It should be added that "the society are of opinion that it will never be possible to employ spider's silk, beautiful as it is, in any profitable manufacture; but have thought proper to confer a reward on this gentleman for his communication, as forming an interesting addition to the natural history of the spider."

* HUNTING SPIDERS.—There is a tribe of hunting spiders, that leap like tigers on their prey; and, what is more extraordinary, have the faculty of doing so sideways. One of these jumped two feet on an humble bee. They approach the object of their intended attack with the noiseless and imperceptible motion of the shadow of a sun-dial. If the fly move, the spider moves also, backwards, forwards, or sideways; and that with so much precision as to time and distance, that the two insects appear as if bound together by some invisible chain, or actuated by the same spirit. If the fly take wing and pitch behind the spider, the head of the latter is turned round to meet it so quickly, that the human eye is deceived, and the spider appears to be motionless. When all these manœuvres bring the fly within its spring, the leap is made with fearful rapidity, and the prey struck down like lightning. The redeeming trait in these cruel creatures is their affection for their young.—FAMILY LIBRARY.

to impregnate the female, in the manner mentioned above, while the bubble in which he was contained unites with the other, like two drops of water, when approached to each other. They spin their webs as well in the water as upon land; and it is most probable that they make their food of the small insects of either element.

CHAP. IV.

THE FLEA.



(The Flea.)

The history of those animals with which we are the best acquainted, are the first objects of our chiefest curiosity. There are few but are well informed of the agility and the blood-thirsty disposition of the flea; of the caution with which it comes to the attack; and the readiness with which it avoids the pursuit. This insect, which is not only the enemy of mankind, but of the dog, cat, and several other animals, is found in every part of the world, but bites with greater severity in some countries than in others. Its numbers in Italy and France are much greater than in England; and yet its bite is much more troublesome here than I have found it in any other place. It would seem that its force increased with the coldness of the climate; and though less prolific, that it became more predaceous.

If the flea be examined with a microscope, it will be observed to have a small head, large eyes, and a roundish body. It has two feelers, or horns, which are short, and composed of four joints; and between these lies its trunk, which it buries in the skin, and through which it sucks the blood in large quantities. The body appears to be all over curiously adorned with a suit of polished sable armour, neatly jointed, and beset with multitudes of sharp pins, almost like the quills of a porcupine. It has six legs, the joints of which are so adapted, that it can, as it were, fold them up one within another; and when it leaps, they all spring out at once, whereby its whole strength is exerted, and the body raised above two hundred times its own diameter.*

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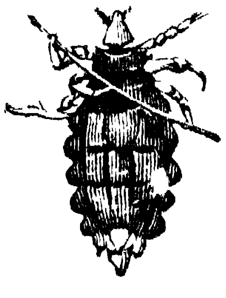
* Muscular Strength of Insects.—The muscular power of insects, as Baron Haller remarks, appears to excel in proportion to their diminutiveness. Of this we have a remarkable example in the common flea, which can draw seventy or eighty times its own weight. The muscular strength of this agile creature enables it not only to resist the ordinary pressure of the fingers in our endeavours to crush it, but to take leaps to the distance of two hundred times its own length; which will appear more surprising when we consider that a man, to equal the agility of a flea, should be able to leap between three and four hundred yards The flea, however, is excelled in leaping by the cuckoo-spit frog-hopper (*tettigonia spumaria*, Olivier), which will sometimes leap two or three yards, that is, more than 250 times its own length; as if (to continue the comparison) a man of ordinary stature should vault through the air to the distance of a quarter of a mile. The minute observation by which such unexpected facts are discovered has in all ages been a fertile source of ridicule for the wits, from the time when Aristophanes in his Clouds introduced Socrates measuring the leap of a flea, up to Peter Pindar's lampoon on Sir Joseph Banks and the emperor-butterfly. To all such flippant wit we have merely to retort the question of the Abbé de la Pluche, "if the Deity thought insects worthy of his divine skill in forming them, ought we to consider them beneath our notice?"

The young fleas are at first a sort of nits or eggs, which are round and smooth; and from these proceed white worms, of a shining pearl colour: in a fortnight's time they come to a tolerable size, and are very lively and active; but if they are touched at this time, they roll themselves up in a ball: soon after this they begin to creep, like silk-worms that have no legs; and then they seek a place to lie hid in, where they spin a silken thread from their mouth, and with this they inclose themselves in a small round bag or case, as white within as writing-paper, but dirty without: in this they continue for a fortnight longer; after which they burst from their confinement perfectly formed, and armed with powers to disturb the peace of an emperor.

CHAP. V.

THE LOUSE AND ITS VARIETIES.



(The Louse.)

The antipathies of mankind are various; some considering the toad, some the serpent, some the spider, and some the beetle, with a strong degree of detestation: but while all wonder at the strangeness of each other's aversions, they all seem to unite in their dislike to the louse, and regard it as their natural and most nauseous enemy. Indeed, it seems the enemy of man in the most odious degree; for wherever wretchedness, disease, or hunger seize upon him, the louse seldom fails to add itself to the tribe, and to increase in proportion to the number of his calamities.

In examining the human louse with the microscope, its external deformity first strikes us with disgust: the shape of the fore part of the head is somewhat oblong, that of the hind part somewhat round: the skin is hard, and being stretched, transparent, with here and there several bristly hairs: in the fore part is a proboscis or sucker, which is seldom visible: on each side of the head are antennæ, or horns, each divided into five joints, covered with bristly hair; and several white vessels are seen through these horns: behind these are the eyes, which seem to want those divisions observable in other insects, and appear encompassed with some few hairs: the neck is very short, and the breast is divided into three parts; on each side of which are placed six legs, consisting of six joints, covered also with bristly hairs: the ends of the legs are armed with two smaller and larger ruddy claws, serving those insects as a finger and thumb, by which they catch hold of such objects as they approach: the end of the body terminates in a cloven tail, while the sides are all over hairy; the whole resembling clear parchment, and, when roughly pressed, cracking with a noise.

When we take a closer view, its white veins, and other internal parts appear; as likewise a most wonderful motion in its intestines, from the transparency of its external covering. When the louse feeds, the blood is seen to rush, like a torrent, into the stomach: and its greediness is so great, that the excrements contained in the intestines are ejected at the same time, to make room for this new supply.

The louse has neither beak, teeth, nor any kind of mouth, as Dr. Hooke described it; for the entrance into the gullet is absolutely closed. In the place of all these, it has a proboscis or trunk; or, as it may be otherwise called, a pointed hollow sucker, with which it pierces the skin, and sucks the human blood, taking that for food only. This stomach is lodged partly in the breast and back; but the greatest portion of it is in the abdomen. When swollen with blood, it appears of a dark brown colour, which is visible through the skin; and is either a faint red, or a full or bright brown, as the contents of the stomach are more or less changed. When it is empty, it is colourless; but when filled, it is plainly discernible, and its motion seems very extraordinary. It then appears working with very strong agitations, and somewhat resembles an animal within an animal. Superficial observers are apt to take this for the pulsation of the heart; but if the animal be observed when it is sucking, it will then be found that the food takes a direct passage from the trunk to the stomach, where the remainder of the old aliment will be seen mixing with the new, and agitated up and down on every side.

If this animal be kept from food two or three days, and then placed upon the back of the hand, or any soft part of the body, it will immediately seek for food; which it will the more readily find, if the hand be rubbed till it grows red. The animal then turns its head, which lies between the two fore legs, to the skin, and diligently searches for some pore: when found, it fixes the trunk therein; and soon the microscope discovers the blood ascending through the head, in a very rapid, and even frightful stream. The louse has at that time sufficient appetite to feed in any posture; it is then seen sucking with its head downward, and its tail elevated. If, during this operation, the skin be drawn tight, the trunk is bound fast, and the animal is incapable of disengaging itself; but it more frequently suffers from its gluttony, since it gorges to such a degree, that it is crushed to pieces by the slightest impression.

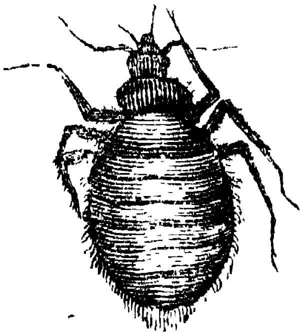
There is scarce any animal that multiplies so fast as this unwelcome intruder. It has been pleasantly said, that a louse becomes a grandfather in the space of twenty-four hours: this fact cannot be ascertained; but nothing is more true than, that the moment the nit, which is no other than the egg of the louse, gets rid of its superfluous moisture, and throws off its shell, it then begins to breed in its turn. Nothing so much prevents the increase of this nauseous animal, as cold and want of humidity; the nits must be laid in a place that is warm, and moderately moist, to produce any thing. This is the reason that many nits laid on the hairs in the night-time, are destroyed by the cold of the succeeding day; and so stick for several months, till they at last come to lose even their external form.

The louse is found upon every part of the human body; but particularly in the heads of children. Those found upon the miners in Sweden, are said, by Linnæus, to be very large; and he is of opinion, that the head and the body-louse differ in no respect from each other. The pthiriasis, or lousy disease, though very little known at present, was frequent enough among the ancients: Herod, Antiochus, Epiphanes, Alcman the poet, Pherecydes, Cassander, Callisthenes and Sylla, all died of this disorder. The use of mercury, which was unknown among the ancients, may probably have banished it from among the moderns; for certain it is, that those animals seldom attack any in our climate, but such as from sloth or famine invite their company.

Such is the history of the human louse, which, from its connexion with mankind, deserves first notice: but it would be endless to describe the various tribes that go under this name, and swarm upon every part of nature. There is scarce an animal, and scarce even a vegetable, that does not suffer under its own peculiar louse. The sheep, the horse, the hog, and the elephant, are all teased by them; the whale, the shark, the salmon, and the lobster, are not without their company; while every hot-house, and every garden, is infested with some peculiarly destructive. Linnæus tells us, that he once found a vegetable-louse upon some plants newly arrived from America; and willing to trace the little animal through its various stages, he brought it with him from London to Leyden; where he carefully preserved it during the winter, until it bred in the spring: but the louse it seems did not treat him with all the gratitude he expected; for it became the parent of so numerous a progeny, that it soon overrun all the physic-garden of that beautiful city; and leaves, to this day, many a gardener to curse the Swede's too indulgent curiosity.

CHAP. VI.

THE BUG AND ITS VARIETIES.



(The Bug.)

THE bug is another of those nauseous insects that intrude upon the retreats of mankind; and often banishes that sleep, which even sorrow and anxiety permitted to approach. This, to many men, is, of all other insects, the most troublesome and obnoxious. The night is usually the season when the wretched have rest from their labour; but this seems the only season when the bug issues from its retreats, to make its depredations. By day it lurks, like a robber, in the most secret parts of the bed; takes the advantage of every chink and cranny, to make a secure lodgment; and contrives its habitation with so much art, that scarce any industry can discover its retreat. It seems to avoid the light with great cunning; and even if candles be kept burning, this formidable insect will not issue from its hiding-place. But when darkness promises security, it then issues from every corner of the bed, drops from the tester, crawls from behind the arras, and travels with great assiduity to the unhappy patient, who vainly wishes for rest and refreshment. It is generally vain to destroy one only, as there are hundreds more to revenge their companion's fate; so that the person who thus is subject to be bitten, remains the whole night like a sentinel upon duty, rather watching the approach of fresh invaders, than inviting the pleasing approaches of sleep.

Nor are these insects less disagreeable from their nauseous stench, than their unceasing appetites. When they begin to crawl, the whole bed is infected with the smell; but if they are accidentally killed, then it is insupportable.

These are a part of the inconveniences that result from the persecution of these odious insects: but happily for Great Britain, they multiply less in these islands than in any part of the continent.* In France and Italy the beds, particularly in their inns, swarm with them; and every piece of furniture seems to afford them a retreat. They grow larger also with them than with us, and bite with more cruel appetite.

The male and female of these animals are plainly distinguishable from each other; and the parts of generation are obvious enough. They are often found coupling tail to tail; and in this state are very easily destroyed. The female has an ovary filled with eggs, joined together like a bunch of grapes; each egg being oblong, almost cylindrical, inclining to white, and pretty transparent. In about two days after impregnation by the male, she deposits her eggs, to the number of about a hundred and fifty, in some convenient place where they are like to receive no disturbance. There they continue for some months; during which time, neither cold nor heat, neither moisture nor fumigation, can in the least retard their exclusion; but they come forth active, and ready for mischief. It is this hardiness in the shell that seems to continue the breed; as the old ones die every winter, or are easily destroyed by any fumigation that is used for that purpose. But the eggs seem incapable of destruction; even those men who make a livelihood by killing those nauseous insects, though they can answer for the parent, can never be sure of the egg. For this reason they usually pay those houses to which they are called a second or a third visit, and at last exterminate them by perseverance.

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* **Bed Bug.**—The common bed bug is supposed to have been first introduced to this country in the fir timber that was brought over to rebuild London after it had suffered by the great fire; for, says Bingley, it is generally said that bugs were not known in England before that time, and many of them were found almost immediately afterwards in the new-built houses.—Ed.

The manner of destroying them seems rather the effects of assiduity than antidote; for the men called in upon this occasion, take every part of the furniture asunder, brush every part of it with great assiduity, anoint it with a liquid, which I take to be a solution of corrosive sublimate, and having performed this operation twice or thrice, the vermin are most usually destroyed.

Cleanliness, therefore, seems to be the best antidote to remove these nauseous insects; and wherever that is wanting, their increase seems but a just punishment. Indeed, they are sometimes found in such numbers among old furniture, and neglected chambers, exposed to the south, that, wanting other sustenance, they devour each other. They are also enemies to other vermin, and destroy fleas very effectually; so that we seldom have the double persecution of different vermin in the same bed. Of the bug kind Linnæus reckons up forty.*

CHAP. VII.

THE WOOD-LOUSE AND ITS VARIETIES.

The common wood-louse is seldom above half an inch long, and a quarter of an inch broad. The colour is of a livid black, especially when found about dunghills, and on the ground; but those that are to be met with under tiles, and in drier places, are of the colour of the hair of an ass. It has fourteen feet, seven on each side; and they have only one joint each, which is scarcely perceivable. It has two short feelers, and the body is of an oval shape. When it is touched, it rolls itself up into a sort of a ball; and the sides, near the feet, are dentated, like a saw. It is often found among rotten timber, and on decayed trees: in winter it lies hid in the crevices of walls and all sorts of buildings. The male is easily distinguishable from the female, being less, and more slender. The eggs they lay are white and shining, like seed pearls, and are very numerous: however, more properly speaking, although, when excluded, the young have all the appearance of an egg, yet they are alive, and, without throwing off any shell, stir and move about with great vivacity; so that this animal may properly be said to be viviparous. The little worms at first seem scarce able to stir; but they soon feed, and become very brisk. These animals are of great use in medicine, being impregnated with a saline quality, which is diuretic and stimulating. Of this insect Linnæus makes three species.*

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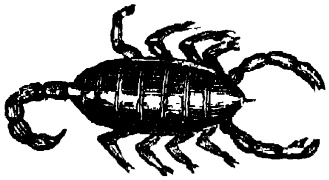
* The Harvest Bug.—This is one of the most teasing little animals in nature. Though bred and intended, like its congener, the red spider, to live on vegetables, as currents, raspberries, and French beans, yet it will desert these, whether by accident or design, to live on and annoy the most delicate and sensitive portion of the human race. These insects are so minute, that they are only visible to the keenest eyes, and then only when placed on any very smooth white surface; in course, they are only known by their effects. Ladies and children are the first to complain of their attacks; and chiefly where any part of the dress fits closely to the skin. There they seat themselves at the intersection of the lines, and lay such firm hold with their feet and jaws, that they cannot be displaced by rubbing, nor by washing, unless a powerful spirit or acid be used. A microscope readily detects them: and, by its assistance, they may be dislodged with the point of a muslin needle, and, if placed on writing-paper, will be seen to have eight legs, two tentacula or feelers, and an abdomen something egg-shaped; colour livid red; and in size no bigger than the point of a small needle. They lacerate the epidermis in some way or other, as a small hole is observable where they have been seated; and cause extreme itching and considerable inflammation of the part.—Magazine Nat. Hist.

CHAP. VIII.

THE SCORPION AND ITS VARIETIES.



(The Scorpion.)

There is scarce an insect without wings that is not obnoxious to man: the smallest have the power of annoying him, either by biting or stinging him; and though each is in itself contemptible, they become formidable from their numbers. But of all this class, there is none so terrible as the scorpion, whose shape is hideous, whose size among the insect tribe is enormous, and whose sting is generally fatal. Happy for England, the scorpion is entirely a stranger among us! In several parts of the continent of Europe it is but too well known, though it seldom grows above four inches long; but in the warm tropical climates, it is seen a foot in length, and in every respect as large as a lobster.

The scorpion is one of the largest of the insect tribe, and not less terrible from its size than its malignity. It resembles a lobster somewhat in shape, but is infinitely more hideous. There have been enumerated nine different kinds of this dangerous insect, chiefly distinguished by their colour: there being scorpions yellow, brown, and ash-coloured; others that are the colour of rusty iron, green, pale yellow, black, claret-colour, white, and grey.

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* Death Watches.—These little creatures, whose portentous click once made stout hearts quail, and still inflicts no small terror on many an ancient dame, even in these days of enlightenment, are thus described by Mr. Carpenter:—This singular noise proceeds from two different insects. One of these, the anòbium tessellàtum, is coleopterous, of a dark colour, and about a quarter of an inch in length. It is chiefly in the latter end of spring it commences its noise, which may be considered analogous to the call of birds. This is caused by beating on hard substances, with the shield or fore-part of its head. The general number of successive distinct strokes is from seven to nine, or eleven. These are given in pretty quick succession, and are repeated at uncertain intervals. In old houses, where the insects are numerous, they may be heard, if the weather be warm, almost every hour in the day. In beating, the insect raises itself upon its hinder legs, and, with the body somewhat inclined, beats its head, with great force and agility, against the place on which it stands. This insect, which is the real death-watch of the vulgar, must not be confounded with a minuter insect, not much unlike a louse, which makes a ticking noise like a watch; but, instead of beating at intervals, it continues its noise for a considerable length of time without intermission. This latter insect, the términes pulsatòrium (Linnæus), belongs to a very different tribe (neuròptera). It is usually found in old wood, decayed furniture, museums, and neglected books. The female lays her eggs, which are exceedingly small, in dry, dusty places, where they are likely to meet with least disturbance. They are generally hatched about the beginning of March, a little sooner or later, according to the weather. After leaving the eggs, the insects are so small as scarcely to be discerned without the use of a glass. They remain in this larva state about two months, somewhat resembling in appearance the mites in cheese; after which they undergo their change into the perfect insect. They feed on dead flies and other insects; and often, from their numbers and voracity, very much deface cabinets of natural history. They subsist on various other substances, and may often be observed carefully hunting for nutritious particles amongst the dust in which they are found, turning it over with their heads, and searching about somewhat in the manner of swine. Many live through the winter, buried deep in the dust, to avoid the frost.—Gill's Technological and Microscopical Repository.

There are four principal parts distinguishable in this animal; the head, the breast, the belly, and the tail. The scorpion's head seems, as it were, jointed to the breast; in the middle of which are seen two eyes, and a little more forward, two eyes more, placed in the fore part of the head; these eyes are so small, that they are scarcely perceivable; and it is probable the animal has but little occasion for seeing. The mouth is furnished with two jaws; the undermost is divided into two, and the parts notched into each other, which serves the animal as teeth, and with which it breaks its food, and thrusts it into its mouth: these the scorpion can at pleasure pull back into its mouth, so that no part of them can be seen. On each side of the head are two arms, each composed of four joints, the last of which is large, with strong muscles, and made in the manner of a lobster's claw. Below the breast are eight articulated legs, each divided into six joints, the two hindmost of which are each provided with two crooked claws, and here and there covered with hair. The belly is divided into seven little rings, from the lowest of which is continued a tail, composed of six joints, which are bristly, and formed like little globes, the last being armed with a crooked sting. This is that fatal instrument which renders this insect so formidable: it is long, pointed, hard, and hollow; it is pierced near the base by two small holes, through which, when the animal stings, it ejects a drop of poison, which is white, caustic, and fatal. The reservoir in which this poison is kept is in a small bladder near the tail, into which the venom is distilled by a peculiar apparatus. If this bladder be gently pressed, the venom will be seen issuing out through the two holes above-mentioned; so that it appears, that when the animal stings, the bladder is pressed, and the venom issues through the two apertures into the wound.

There are few animals more formidable, or more truly mischievous than the scorpion. As it takes refuge in a small place, and is generally found sheltering in houses, so it cannot be otherwise than that it must frequently sting those among whom it resides. In some of the towns of Italy, and in France, in the province of Languedoc, it is one of the greatest pests that torment mankind; but its malignity in Europe is trifling, when compared to what the natives of Africa, and the East, are known to experience. In Batavia, where they grow twelve inches long, there is no removing any piece of furniture, without the utmost danger of being stung by them. Bosman assures us, that, along the Gold-coast, they are often found larger than a lobster, and that their sting is inevitably fatal. In Europe, however, they are by no means so large, so venomous, or so plentiful.

The spirit of this animal, which is of the fiercest nature, is dangerous even to its own species, for scorpions are the cruelest enemies to each other. Maupertuis put about a hundred of them together in the same glass, and they scarce came into contact, when they began to exert all their rage in mutual destruction; there was nothing to be seen but one universal carnage, without any distinction of age or sex, so that, in a few days, there remained only fourteen, which had killed and devoured all the rest.

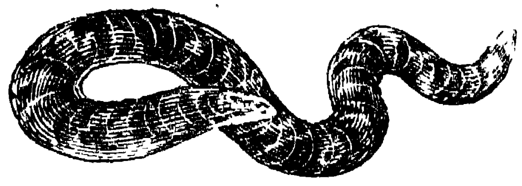
But their unnatural malignity is still more apparent, in their cruelty to their offspring. He inclosed a female scorpion, big with young, in a glass vessel, and she was seen to devour them as fast as they were excluded; there was but one only of the number that escaped the general destruction, by taking refuge on the back of its parent; and this soon after revenged the cause of its brethren, by killing the old one in its turn.

Such is the terrible and unrelenting nature of this insect, which neither the bonds of society, nor of nature can reclaim: it is even asserted that, when driven to an extremity, the scorpion will often destroy itself. The following experiment was ineffectually tried by Maupertuis, but I am so well assured of it by many eye-witnesses, who have seen it both in Italy and America, that I have no doubt remaining of its veracity. A scorpion, newly caught, is placed in the midst of a circle of burning charcoal, and thus an egress prevented on every side; the scorpion, as I am assured, runs for about a minute round the circle, in hopes of escaping, but finding that impossible, it stings itself on the back of the head, and in this manner the undaunted suicide instantly expires.[*]

The chief food of scorpions is worms and insects; and upon a proper supply of these, their lives might be lengthened to their natural extent. How long that may be we are not told; but if we may argue from analogy, it cannot be less than seven or eight years; and perhaps, in the larger kind, double that duration. As they have somewhat the form of the lobster, so they resemble that animal in casting their shell, or more properly their skin, since it is softer by far than the covering of the lobster, and set with hairs, which grow from it in great abundance, particularly at the joinings. The young lie in the womb of the parent, each covered up in its own membrane, to the number of forty or fifty, and united to each other by an oblong thread, so as to exhibit altogether the form of a chaplet, and are brought forth alive.

CHAP IX.

THE LEECH.



(The Leech.)

The last of this wingless tribe that I shall mention is the leech, which, like all the former, undergoes no varieties of transformation; but when once excluded from the body of the parent, preserves its first figure to the end.[†]

The leech, from its uses in medicine, is one of those insects that man has taken care to provide; but, of a great variety, one kind only is considered as serviceable. The horse-leech, which is the largest of all, and grows to four inches in length, with a glossy black surface, is of no use, as it will not stick to the skin; the snail-leech is but an inch in length, and though it will stick, is not large enough to extract a sufficient quantity of blood from the patient; the broad-tailed leech, which grows to an inch and a half in length, with the back raised into a sort of a ridge, will stick but on very few occasions: it is the large brown leech, with a whitish belly, that is made use of in medicine, and whose history best merits our curiosity.

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[*] The poet has converted the fact into a striking illustration when treating of the fiercer passions.—Ed.

> The mind that broods o'er guilty woes,
> Is like the scorpion girt by fire
> In circle narrowing as it glows,
> Till, inly searched by thousand throes,
> And maddening in her ire,
> One sad and sole relief she knows,
> The sting she nourished for her foes,
> Whose venom never yet was vain,
> Gives but one pang, and cures all pain,
> And darts into her desperate brain;
> So do the dark in soul expire,
> Or live like scorpion girt by fire.—Byron.

[†] The Flying Leech—Is common in the jungles in the interior of Ceylon; and the native troops, on their march to Canely, suffered very severely from their bite, occasionally even to the loss of life or limb: their legs were covered with them, and streamed with blood. I saw one of these animals in a horse's leg. It is much smaller than the common leech, the largest, when at rest, being not more than half an inch long, and may be extended till it becomes a fine string—the smaller ones are very minute. They possess the power of springing, by means of a filament, to a considerable distance.—Heber's Narrative.

The leech has the general figure of a worm, and is about as long as one's middle finger. Its skin is composed of rings, by means of which it is possessed of its agility, and swims in water. It contracts itself, when out of water, in such a manner, that, when touched, it is not above an inch long. It has a small head, and a black skin, edged with a yellow line on each side, with some yellowish spots on the back. The belly also, which is of a reddish colour, is marked with whitish yellow spots. But the most remarkable part of this animal is the mouth, which is composed of two lips, that take whatever form the insect finds convenient. When at rest, the opening is usually triangular, and within it are placed three very sharp teeth, capable of piercing not only the human skin, but also that of a horse or an ox. Still deeper in the head, is discovered the tongue, which is composed of a strong fleshy substance, and which serves to assist the animal in sucking, when it has inflicted its triple wound; for no sooner is this voracious creature applied to the skin than it buries its teeth therein, then closes its lips round the wound which it has made, and thus, in the manner of a cupping-glass, extracts the blood as it flows to the different orifices.

In examining this animal's form farther towards the tail, it is seen to have a gullet and an intestinal canal, into which the blood flows in great abundance. On each side of this are seen running along several little bladders, which, when the animal is empty, seem to be filled with nothing but water; but when it is gorging blood, they seem to communicate with the intestines, and receive a large portion of the blood which flows into the body. If these bladders should be considered as so many stomachs, then every leech will be found to have twenty-four. But what is most extraordinary of all in this animal's formation is, that though it takes so large a quantity of food, it has no anus or passage to eject it from the body when it has been digested. On the contrary, the blood which the leech has thus sucked remains for several months clotted within its body, blackened a little by the change, but no way putrefied, and very little altered in its texture or consistence. In what manner it passes through the animal's body, or how it contributes to its nourishment, is not easily accounted for. The water in which they are kept is very little discoloured by their continuance; they cannot be supposed to return the blood by the same passage through which it was taken in; it only remains, therefore, that it goes off through the pores of the body, and that these are sufficiently large to permit its exclusion.*

But it is not in this instance alone that the leech differs from all other insects. It was remarked in a former chapter, that the whole insect tribe had the opening into their lungs placed in their sides; and that they breathed through those apertures as other animals through the mouth. A drop of oil poured on the sides of a wasp, a bee, or a worm, would quickly suffocate them, by stopping up the passages through which they breathe; but it is otherwise with the leech, for this animal may be immersed in oil without injury; nay, it will live therein; and the only damage it will sustain is, that when taken out it will be seen to cast a fine pellucid skin exactly of the shape of the animal, after which it is as alert and vigorous as before. It appears from hence that the leech breathes through the mouth; and, in fact, it has a motion that seems to resemble the act of respiration in more perfect animals; but concerning all this we are very much in the dark.

This animal seems to differ from all others in several respects; the rest of the reptile tribe are brought forth from eggs; the leech is viviparous, and produces its young one after the other, to the number of forty or fifty at a birth.† It is probable that, like the snail, each insect contains the two sexes, and that it impregnates, and is impregnated, in the same manner. The young ones are chiefly found in the month of July, in shallow running waters, and particularly where they are tepified by the rays of the sun. The large ones are chiefly sought after; and being put into a glass vessel filled with water, they remain for months, nay, for years, without taking any other subsistence. But they never breed in this confinement; and, consequently, what regards that part of their history still remains obscure.

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* Communication of Disease by Leeches.—In a journal entitled the *Westphaelischer Anzeiger*, a case is recorded where some leeches, which had been employed first on a syphilitic patient and afterwards on an infant, communicated the disease to the latter. This warns us not to apply leeches to a second person without having sufficient assurance that the previous affection of the first patient was not infectious.—Med. Rep.

† Reproduction of Leeches.—It has been found by M. Pallas, that after leeches have been used for medicinal purposes, they are most reproductive. He puts them into a box with argillaceous earth, six inches deep, at any time from the middle of August till

In this part of the world they seldom grow to above four inches; but in America and the East they are found from six to seven. Their pools there abound with them in such numbers, that it would be dangerous bathing there, if for no other consideration.*

When leeches are to be applied, the best way is to take them from the water in which they are contained about an hour before, for they thus become more voracious, and fasten more readily. When saturated with blood, they generally fall off of themselves; but if it be thought necessary to take them from the wound, care should be used to pull them very gently, or even to sprinkle them with salt if they continue to adhere; for if they be plucked rudely away, it most frequently happens that they leave their teeth in the wound, which makes a very troublesome inflammation, and is often attended with danger. If they be slow in fixing to the part, they are often enticed by rubbing it with milk or blood, or water mixed with sugar. As salt is a poison to most insects, many people throw it upon the leech when it has dropped from the wound, by which means it disgorges the blood it has swallowed, and it is then kept for repeated application. They seldom, however, stick after this operation; and as the price is but small, fresh leeches should always be applied whenever such an application is thought necessary.†

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the end of September. In five months cocoons will be found, each containing twelve individuals. The cocoons are, on the outside, light, porous, and woolly, to keep out moisture and regulate the temperature; on the inside they are fibrous and dense, inclosing a thin multilocular pellicle, which contains germs.—BULLETIN DES SCIENCES.

As the medicinal leech is a native of Britain, and by no means uncommon in lakes and pools in marshes, the preceding experiments of M. Pallas might, perhaps, be turned to profitable account in the breeding of animals in such extensive demand as leeches. The greater number, it may be supposed, of the leeches which have been used, die soon afterwards; but if they were employed as breeders, and since M. Pallas says they are the best breeders, it would be turning a loss into a considerable profit.—LOUDON'S MAGAZINE OF NATURAL HISTORY.

* AMERICAN WAR.—Our sailors and soldiers, who in the American war were obliged to walk in those counties through marshy grounds, talk with terror of the number of leeches that infested them on their march. Even in some parts of Europe they increase so as to become formidable. Sedelius, a German physician, relates, that a girl of nine years old, who was keeping sheep near the city of Bomst, in Poland, perceiving a soldier making up to her, went to hide herself in a neighbouring marsh among some bushes; but the number of leeches was so great in that place, and they stuck to her so close, that the poor creature expired from the quantity of blood which she lost by their united efforts. Nor is this much to be wondered at, since one of those insects, that, when empty, generally weighs but a scruple, will, when gorged, weigh more than two drachms.—G.

† PRESERVATION OF LEECHES.—A new vessel of deal, large enough to contain sufficient water for five hundred leeches, is to be furnished with a stop-cock to draw off the water. It is to be half filled with the mud from the lake or pond whence the leeches have been taken, and two or three roots of the Florence Iris (*Calamus Aromaticus*) are to be set in the mud. The leeches like this plant. The usual precautions as to temperature, frequent change of water, &c., are to be taken; the water is to be changed slowly, and the fresh water added by means of a funnel descending to the bottom of the vessel. This method has been found preferable to all others tried at the hospital of Bamberg.—BULL UNIV.

into the sand, which it throws with its horns, or feelers, towards the edges, as we see men throw up sand in a gravel pit. Thus, by repeating its labours all round, the sand is thrown up in a circle about the edge of the pit, until the hole is quite completed. This hole is always formed in a perfect circle; and the pit itself resembles the inside of an inverted funnel. When this insect first leaves the egg and is newly hatched, the first pit it makes is very small; but as it grows bigger, it makes a larger hole; which is destined, like a pit-fall, to entrap its prey. It is generally about two inches deep, and as much in diameter.

The work being thus with great labour finished, the insidious insect places itself in ambush, hiding itself in the bottom under the sand in such a manner, that its two horns encircle the bottom of the pit. All the sides of this pit-fall are made of the most loose and crumbling materials; so that scarce any insect can climb up that has once got down to the bottom. Conscious of this, the lion-ant remains in patient expectation, ready to profit by that accident which throws some heedless little animal into his den. If then, by misfortune, an ant, a wood-louse, or a small caterpillar, walks too near the edge of the precipice, the sand gives way beneath them, and they fall to the bottom of the pit, where they meet inevitable destruction. The fall of a single grain of sand gives the murderer notice at the bottom of its cave; and it never fails to sally forth to seize upon its prey. It happens sometimes, however, that the ant or the wood-louse is too nimble, and runs up the sides of the pit-fall before the other can make ready to seize it. The lion-ant has then another contrivance, still more wonderful than the former; for, by means of its broad head and feelers, it has a method of throwing up a shower of sand, which falls upon the struggling captive with tremendous weight, and once more crushes it down to the bottom. When the insect is once fallen thus low, no efforts can retrieve or release it; the lion-ant seizes it with its feelers, which are hollow, and darting them both into its body, sucks out all the little animal's juices with the utmost rapacity.*

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* REFLECTIONS SUGGESTED BY THIS INSECT.—The instance of the ant-lion naturally leads us to consider the design of the Author of Nature in so nicely adjusting, in all animals, the means of destruction and of escape. As the larger quadrupeds of prey are provided with a most ingenious machinery for preying on the weaker, so are these furnished with the most admirable powers of evading their destroyers. In the economy of insects, we constantly observe, that the means of defence, not only of the individual creatures, but of their larvæ and pupæ, against the attacks of other insects, and of birds, is proportioned, in the ingenuity of their arrangements, to the weakness of the insect employing them. Those species which multiply the quickest have the greatest number of enemies. Bradley, an English naturalist, has calculated that two sparrows carry, in the course of a week, above three thousand caterpillars to the young in their nests. But though this is, probably, much beyond the truth, it is certain that there is a great and constant destruction of individuals going forward; and yet the species is never destroyed. In this way a balance is kept up, by which one portion of animated nature cannot usurp the means of life and enjoyment which the world offers to another portion. In all matters relating to reproduction, Nature is prodigal in her arrangements. Insects have more stages to pass through before they attain their perfect growth than other creatures. The continuation of the species is, therefore, in many cases, provided for by a much larger number of eggs being deposited than ever become fertile. How many larvæ are produced, in comparison with the number which pass into the pupa state; and how many pupæ perish before they become perfect insects! Every garden is covered with caterpillars; and yet how few moths and butterflies, comparatively, are seen, even in the most sunny season! Insects which lay few eggs are, commonly, most remarkable in their contrivances for their preservation. The dangers to which insect life is exposed are manifold; and therefore are the contrivances for its preservation of the most perfect kind, and invariably adapted to the peculiar habits of each tribe. The same wisdom determines the food of every species of insect; and thus some are found to delight in the rose-tree, and some in the oak. Had it been otherwise, the balance of vegetable life would not have been preserved. It is for this reason that the contrivances which an insect employs for obtaining its food are curious, in proportion to the natural difficulties of its structure. The ant-lion is carnivorous, but he has not the quickness of the spider, nor can he spread a net over a large surface, and issue from his citadel to seize a victim which he has caught in his outworks. He is, therefore, taught to dig a trap, where he sits, like

motion. They are ejected by the female into the water in clusters, like a bunch of grapes, where they sink to the bottom by their natural weight, and continue in that state till the young ones find strength enough to break the shell, and to separate from each other. The form in which they first show life, is that of a worm with six legs, bearing a strong resemblance to the dragon-fly in its winged state, except that the wings are yet concealed within a sheath peculiar to this animal. The rudiments of these appear in bunches on the back, within which the wings are folded up into each other, while all the colours and varieties of painting appear transparent through the skin. These animals, upon quitting the egg, still continue in the water, where they creep and swim, but do not move swiftly. They have likewise a sharp sight, and immediately sink to the bottom if any one comes to the places wherein they live, or whenever they perceive the least uncommon object. Their food at that time is soft mud and the glutinous earthy substances that are found at the bottom.

When these animals prepare to change from their reptile to their flying state, they then move out of the water to a dry place; as into grass; pieces of wood, stone, or any thing else they meet with. They there firmly fix their acute claws; and, for a short time, continue quite immovable, as if meditating on the change they are to undergo. It is then observed, that the skin first opens on the head and back; and out of this opening they exhibit their real head and eyes, and at length their six legs; whilst, in the mean time, the hollow and empty skin, or slough of their legs, remains firmly fixed in its place. After this, the inclosed creature creeps forward by degrees; and by this means draws first its wings and then its body out of the skin; and proceeding a little farther, sits at rest for some time, as if immovable. During this time, the wings, which were moist and folded, begin by degrees to expand themselves, and to make smooth and even all those plaits which were laid against each other, like a closed fan. The body is likewise insensibly extended, until all the limbs have obtained their proper size and dimensions. All these surprising and difficult operations are accomplished by the force of the blood and the circulating humours. The creature cannot at first make use of its new wings, and therefore is forced to stay in the same place until all its limbs are dried by the circumambient air. It soon, however, begins to enter upon a more noble life than it had hitherto led in the bottom of the brook; and from creeping slowly and living accidentally, it now wings the air, and makes choice from amidst the variety of its provisions.

Indeed, no animal is more amply fitted for motion, subsistence, and enjoyment.. As it haunts and seeks after its food flying in the air, Nature has provided it with two large eyes, which make almost the whole head, and which resemble glittering mother-of-pearl.* It has also four expansive silver-coloured wings, with which, as with oars, it can turn itself with prodigious velocity; and to assist these, it is furnished with a very long body, which, like a rudder, directs its motions. As the wings are long, and the legs short, they seldom walk, but are ever seen either resting or flying. For this reason, they always choose dry branches of trees or shrubs to remain on; and when they have refreshed themselves a little, they renew their flight. Thus they are seen, adorning the summer with a profusion of beauty, lightly traversing the air in a thousand directions, and expanding the most beautiful colours to the sun. The garden, the forest, the hedges, and the rivulets, are animated by their sports; and there are few who have been brought up in the country, who have not employed a part of their childhood in the pursuit.*

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* On the Eyes of Flies.—The eyes of flies are of a reticulated texture, and each reticulated eye of this kind is truly an assemblage of multitudes, often of many thousands of small but perfect eyes Mr Hook computed 14,000 hemispheres in two eyes of a drone; Mr Leeuwenhoeck reckoned 6,236 in a silk-worm's two eyes in its fly state; 3,181 in each eye of a beetle; and 8,000 in the two eyes of a common fly. The pearl eyes of the dragon-fly appear with a common reading-glass like shagreen; and Mr. Leeuwenhoeck reckons in each eye of this insect 12,544 lenses, placed in an hexangular position, each lens having six others round it, which is also the order most common in other eyes. He likewise observed in the centre of each lens a minute transparent spot, brighter than the rest, and supposed to be the pupil through which the rays of light are transmitted upon the retina. This spot had three circles surrounding it, and seemed seven times less than the diameter of the whole lens. We see here (says Baker), in each of these exceedingly minute lenticular surfaces, as much anatomy in the figure and polish, and as much contrivance and beauty, as in the eye of a whale or an elephant; and how delicate, how exquisitely delicate, must the filaments of the retina be, which serve to each of these, since the whole picture of objects painted thereon must be millions of times less than the images of them pictured on the human eye! The above are striking instances of Divine geometry and optics. Adams on the Microscope, page 376, says, "the eyes (of the libellula, or dragon-flies) are so perfectly smooth and polished, that when viewed as an opaque object, they will, like so many mirrors, reflect the images of all the surrounding objects. The figure of a candle may be seen multiplied almost to infinity, and one soldier re-

But while these beautiful flies appear to us so idly and innocently employed, they are, in fact, the greatest tyrants of the insect tribe; and, like the hawk among birds, are only hovering up and down to seize their prey. They are the strongest and the most courageous of all winged insects; nor is there one, how large soever, that they will not attack and devour. The blue fly, the bee, the

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flected would appear an army on their surfaces, shifting its beam to each eye according to the motion given it by the observer's hands."—Correspondent of the Mirror.

* On the Resplendent Beauty of the Fire Fly.—"The history of this beautiful insect," says a correspondent of the *Mirror*, "as related by Madame Merian, in her account of the insects of Surinam, is truly surprising. She says, 'Once, when the Indians brought me a number of these lantern-carriers, I put them into a wooden box, without being aware of their shining at night—but one night, being awakened by an unusual noise, and much frightened, I jumped out of bed and ordered a light, not knowing whence the noise proceeded. We soon perceived that it originated in the box, which we opened with some inquietude, but were still more alarmed, after opening it, and letting it fall on the ground, for a flame appeared to issue from it, which seemed to receive additional lustre as often as another flew out of it. When we perceived this some time, we recovered from our terror, and admired the splendour of these little animals.' These remarks are confirmed by Dr. Grew, who says, 'that two or three of these insects fastened to a stick, or otherwise conveniently disposed of, will give sufficient light to those who walk, or travel in the night.' This is the insect to which Thompson alludes in his view of the torrid zone, thus—

'From Menam's orient stream, that nightly shines
with *insect lamps*,'

and Mrs. Barbauld says,

'Some shoot like *living stars*, athwart the night,
And scatter from their wings a *vivid light*,
To guide the Indian to his tawny loves,
As thro' the woods with cautious steps he moves.'

"These are Nature's gems glittering in the pathless woods of the tropical regions. Pere du Tertre declares, in his *Histoire des Antilles*, that he could distinctly read his prayers by the light of one of them; and Lesser, in his *Theologie des Insectes*, affirms, that the Indians keep them in their houses, and require no other light in the night-time, an insect of this sort being sufficient so far to illuminate an apartment of moderate size, as to enable its inhabitants to perform whatever household work may be necessary. When the fly is dead, their bodies will still afford considerable light, though less vivid than before; and if bruised, and rubbed over the hand and face, they become luminous in the dark, like a board besmeared with phosphorus. They have a reddish, brown colour, and live in rotten trees in the day, but are always abroad in the night. Under the belly, is a circular patch, which, in the dark, shines like a candle; and on each side of the head, near the eyes, is a prominent globular, luminous body, in size about one-third larger than a mustard seed. Each of these bodies is like a rising star, emitting a bright, and not small light. The largest species of fly is rather more than one inch in length. Another species is not more than half that size, and their light proceeds from under their wings, and is seen only when they are elevated, like sparks of fire, appearing and disappearing every second. Of these the air is full in the night, though they are never seen in the day. They are common, not only in the southern, but northern parts of America, during the summer. In Siam, the trees on the banks of the river Main, in summer, are beautifully illuminated* with swarms of fire-flies, which emit and conceal their light as uniformly as if it proceeded from a machine of the most exact contrivance. Darwin beautifully says—

'You bid in air the tropic beetle burn,
And fill with golden flame his winged urn.'

But no language can depict the beauties of this splendid tribe, for,

'Who can paint like nature?
Can imagination boast amidst its gay creation hues
like hers?'"

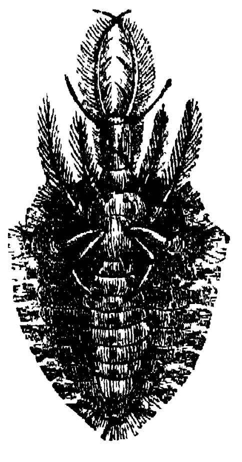
- the fire-fly's red light,
With its quick-glancing splendour illumines the
night."

wasp, and the hornet, make their constant prey; and even the butterfly, that spreads so large a wing, is often caught and treated without mercy. Their appetite seems to know no bounds; they spend the whole day in the pursuit, and have been seen to devour three times their own size in the capture of a single hour. They seize their prey flying with their six claws, and tear it easily to pieces with their teeth, which are capable of inflicting troublesome wounds.

CHAP. III.

THE FORMICA LEO, OR LION-ANT.

Although this animal properly belongs to no order of insects, yet, as it is changed into a fly very much resembling that described in the preceding chapter, it may not be improper to give its history here. If we consider the life of this animal in its different stages of existence, we shall find it equally wonderful in all; but as it changes to a dragon-fly, what we have said of that animal above need not be repeated here. The lion-ant, in its reptile state, is of the size of a common wood-louse, but somewhat broader. It has a pretty long head and a roundish body, which becomes a little narrower towards the tail. The colour is a dirty grey, speckled with black, and the body is composed of several flat rings, which slip one upon another. It has six feet, four of which are fixed to the breast and two to the neck. The head is small and flat, and before there are two little smooth horns and feelers, which are hard, about a quarter of an inch long, and crooked at the ends. At the basis of the feelers there are two small, black, lively eyes, by which it can see the smallest object, as is easily discovered by its starting from every thing that approaches.


(The Ant-Lion.)

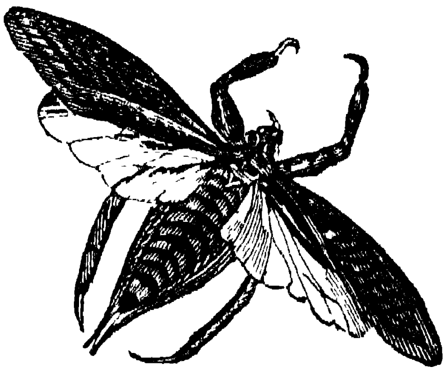
To a form so unpromising, and so ill-provided for the purposes of rapacity, this animal unites the most ravenous appetites in nature; but to mark its imbecility still stronger, as other animals have wings or feet to enable them to advance towards their prey, the lion-ant is unprovided with such assistance from either. It has legs indeed; but these only enable it to run backward, so that it could as soon die as make the smallest progressive motion. Thus, famished and rapacious as it ever seems, its prey must come to it, or rather into the snare provided for it, or the insidious assassin must starve.

But Nature, that has denied it strength or swiftness, has given it an equivalent in cunning, so that no animal fares more sumptuously, without ever stirring from its retreat. For this purpose, it chooses a dry sandy place, at the foot of a wall, or under some shelter, in order to preserve its machinations from the rain. The driest and most sandy spot is the most proper for it; because a heavy clogged earth would defeat its labour. When it goes about to dig the hole where it takes its prey, it begins to bend the hinder part of its body, which is pointed, and thus works backward; making, after several attempts, a circular furrow, which serves to mark out the size of the hole it intends making, as the ancients marked out the limits of a city with the plough. Within this first furrow it digs a second; then a third; and afterwards others, which are always less than the preceding. Then it begins to deepen its hole, sinking lower and lower

CHAP. I.

THE SECOND ORDER OF INSECTS.

In the former part we gave a concise history of the most considerable insects that, without wings, were produced in a perfect state; either from the body or the parent alive, like quadrupeds, or from the egg, in the manner of birds. We come now to a second order of insects, that are produced from the egg, like the former, but not in a perfect state; for when first excluded, they are without wings. This, however, does not hinder the exercise of their animal functions; the insect, although not yet come to perfection, walks, leaps, and eats; nor is it ever deprived of motion, only that it rests a little when it is about to cast that part of its skin previous to its state of perfection. It is then seen to assume two wings, which, like a budding flower, burst through the case that contained them, and the animal becomes a winged insect in its state of highest perfection. To this order we may refer the Libella, or Dragon-Fly; the Formica Leo, or Lion-Ant; the Grasshopper; the Locust; the Cricket; the Wood-Cricket; the Mole-Cricket; the Flea-Locust; the Flying-Bug; the Tipula; the Water-Scorpion; the Notonecta, or Water-Fly; and many others.



(The Surinam Bug.)

CHAP. II.

THE LIBELLA, OR DRAGON-FLY.

Of all the flies which adorn or diversify the face of Nature, these are the most various and the most beautiful; they are of all colours; green, blue, crimson, scarlet, white; some unite a variety of the most vivid tints, and exhibit in one animal more different shades than are to be found in the rainbow.

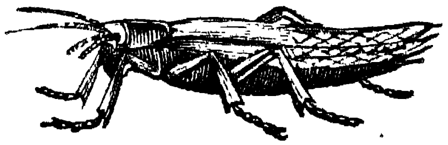
Dragon-flies, though there are three or four different kinds, yet agree in the most striking parts of their history, and one account may serve for all. The largest sort are generally found from two to three inches long, their tail is forked; their body divided into eleven rings; their eyes are large, horny, and transparent, divided by a number of intersections; and their wings, that always lie flat when they are at rest, are of a beautiful glossy transparency; sometimes shining like silver, and sometimes glistening like gold. Within the mouth are to be seen two teeth covered with a beautiful lip: with these the creatures bite fiercely when they are taken; but their bite is perfectly harmless, as I have experienced more than once.

These insects, beautiful as they are, are produced from eggs, which are deposited in the water, where they remain for some time without seeming life or

When the prey is thus reduced to a husk, and nothing but the external form remains, the next care of the murderer is to remove the body from its cell; since the appearances of dead carcasses might forewarn other insects of the danger of the place. The insect, therefore, takes up the wasted trunk with its feelers, and throws it, with wonderful strength, at least six inches from the edge of its hole; and then patiently sets about mending the breaches which its fortifications had received in the last engagement. Nothing can abate its industry, its vigilance, its patience, or its rapacity. It will work for a week together to make its pitfall; it will continue upon the watch for more than a month, patiently expecting the approach of its prey; and if it comes in greater quantities than is needful, yet still the little voracious creature will quit the insect it has newly killed, and leave it half eaten, to kill and attack any other that happens to fall within the sphere of its malignity: though so voracious, it is surprisingly patient of hunger; some of them having been kept in a box with sand for six months and upwards, without feeding at all.

CHAP. IV.

THE GRASSHOPPER, THE LOCUST, THE CICADA, THE CRICKET, AND THE MOLE-CRICKET.



(The Grasshopper.)

Belonging to the second order of insects, we find a tribe of little animals, which, though differing in size and colour, strongly resemble each other in figure, appetites, nature, and transformation. But though they all appear of one family, yet man has been taught to hold them in different estimation; for while some of this tribe amuse him with their chirpings, and banish solitude from the fields, others come in swarms, eat up every thing that is green, and in a single night convert the most delightful landscape into a dreary waste. However, if these animals be separately considered, the devouring locust is not in the least more mischievous than the musical grasshopper; the only difference is, that one species comes for food in a swarm, the other feeds singly.

That animal which is called the grasshopper with us, differs greatly from the cicada of antiquity; for as our insect is active enough in hopping through the long grass, from whence it has taken its name, the cicada had not this power, but either walked or flew. The little hissing note also of our grasshopper is very different from the song of the cicada, which was louder and far more musical. The manner in which this note is produced by the two animals is very different; for the cicada makes it by a kind of buckler, which the male has beneath its belly, the grasshopper by a transparent membrane that covers a hole at the base of its wings. There is still a greater variety in all these with regard to shape and colour. Some are green, some black, some livid, and some

the unwieldly giants of fable, waiting for some feeble one to cross his path. How laborious and patient are his operations—how uncertain the chances of success! Yet he never shrinks from them, because his instinct tells him that by these contrivances alone can he preserve his own existence, and continue that of his species.—Insect Archi.

variegated, but many of them do not show all their colours till they fly. Some have long legs, some short; some with more joints, others with fewer.* Some sing, others are mute; some are innocent, doing no damage to the husbandman, while others do such prodigious mischief, that they are looked upon in some countries as one of the terrible scourges of the incensed Divinity.

Of this variegated tribe, the little grasshopper that breeds in such plenty in every meadow, and that continues its chirping through the summer, is best known to us; and by having its history we shall be possessed of that of all the rest. This animal is of the colour of green leaves, except a line of brown which streaks the back, and two pale lines under the belly and behind the legs. It may be divided into the head, the corslet, and the belly. The head is oblong, regarding the earth, and bearing some resemblance to that of a horse. Its mouth is covered by a kind of round buckler jutting over it, and armed with teeth of a brown colour, hooked at the points. Within the mouth is perceivable a large reddish tongue, and fixed to the lower jaw. The feelers or horns are very long, tapering off to a point; and the eyes are like two black specks, a little prominent. The corslet is elevated, narrow, armed above and below by two serrated spines. The back is armed with a strong buckler, to which the muscles of the legs are firmly bound, and round these muscles are seen the vessels by which the animal breathes, as white as snow. The last pair of legs are much longer and stronger than the first two pair, fortified by thick muscles, and very well formed for leaping. It has four wings, the anterior ones springing from the second pair of legs, the posterior from the third pair. The hinder wings are much finer and more expansive than the foremost, and are the principal instruments of its flight. The belly is considerably large, composed of eight rings, and terminated by a forky tail, covered with down, like the tail of a rat. When examined internally, besides the gullet, we discover a small stomach, and behind that a very large one, wrinkled and furrowed within side; lower down there is still a third; so that it is not without reason that all the animals of this order are said to chew the cud, as they so much resemble ruminant animals in their internal conformation.

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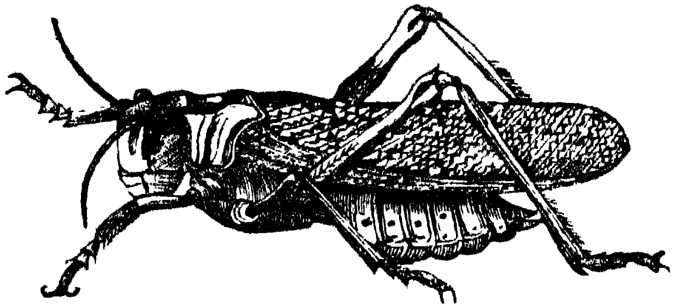
* Locomotion of Insects.—Those who have attended to the paces of the larger animals, are well aware of their almost infinite variety; but the differences between the heavy tread of the elephant or the waddling roll of an overgrown pig, the elegant pace of a blood-horse or the sprightly trip of an antelope, will bear no comparison with the infinite diversities observable among the movements of insects. We look upon the long legs of the giraffe and the crane as inelegant and disproportionate, how well suited soever they may be to their mode of life: but what should we think of a species of giraffe, with legs long enough to enable it to overtop the tallest trees, so as to browse on their tops as oxen do on the grass of a meadow, while it walked at ease through woods and forests; or of a wren or sparrow with legs as long as the hop-poles among which it prowled to prey upon aphides and lady-birds. But animals of such descriptions, wildly imaginary as they must be confessed to be, may be readily matched in the insect world. The pendulum crane fly (*tipula motitatrix*), formerly mentioned, as well as the shepherd spider (*phalangium opilio*), described in the same place, are remarkable examples of this; and we have still more striking instances in the large clouded-winged crane fly (*tipula gigantea*, Meigen), popularly termed father long-legs, or jenny-spinner, their stilted legs enabling these insects to overtop the grass as they walk in the meadows, in the same way as our imaginary giraffe would overtop the trees in a forest. We have been more struck with instances of this in some of the bug tribe, because here it was least to have been expected. In our earlier entomological researches, we frequently noticed, upon a white-washed wall, a very strange looking insect, if insect it might be called, moving about in the most awkward manner imaginable. It looked, however, more like a slip of grey tree-bark, not half the breadth of a wheat-straw, that had been accidentally caught on some straggling films of spiders' web, which allowed it to oscillate irregularly in the air, than a real living creature,—for the long gossamer legs did not, to the unassisted eye, appear to move at all, and the slender, awkward body progressed by interrupted jerks (if such slow motions may be so termed), resembling the movement of the minute-hand of a clock. The glass, however, showed that the body was covered by the folds of four membranous wings, prettily mottled, which lay in a hollow groove on the back, while the long slender legs were elegantly ringed with white. It was, in short, one of the numerous family of plant-bugs (*neides elegans?* Curtis), which had strayed from the adjacent garden to the wall. Another occurred in the same place somewhat similar, but considerably smaller, and stalked along with equally awkward jerks, upon only its four hind-legs, while it kept its two fore-legs, which were greatly shorter, folded up under its belly, in readiness, probably, to seize on the first luckless mite or aphis that came in its way. The latter appears to be the wandering plant-bug (*ploiaria vagabunda*, Scopoli).—Insect Trans.

A short time after the grasshopper assumes its wings, it fills the meadow with its note, which, like that among birds, is a call to courtship. The male only of this tribe is vocal; and, upon examining at the base of the wings, there will be found a little hole in its body, covered with a fine transparent membrance. This is thought, by Linnæus, to be the instrument it employs in singing, but others are of opinion the sound is produced by rubbing its hinder legs against each other: however this be, the note of one male is seldom heard, but it is returned by another; and the two little animals, after many mutual insults of this kind, are seen to meet and fight desperately. The female is generally the reward of victory; for, after the combat, the male seizes her with his teeth behind the neck, and thus keeps her for several hours, till the business of fecundation is performed. They are at that time so strongly united, that they can scarcely be separated without tearing asunder. Towards the latter end of autumn the female prepares to deposit her burthen, and her body is then seen greatly distended with her eggs, which she carries to the number of a hundred and fifty. In order to make a proper lodgment in the earth for them, nature has furnished her with an instrument at her tail, somewhat resembling a two-edged sword, which she can sheath and unsheath at pleasure; with this she pierces the earth as deep as she is able, and into the hole which her instrument has made, she deposits her eggs, one after the other.


(The Locust.)

Having thus provided for the continuation of her posterity, the animal herself does not long survive; but, as the winter approaches, she dries up, seems to feel the effects of age, and dies from a total decay. Some, however, assert, that she is killed by the cold; and others, that she is eaten by worms: but certain it is, that neither the male nor female are ever seen to survive the winter. In the meantime the eggs which have been deposited continue unaltered, either by the severity of the season, or the retardation of the spring. They are of an oval figure, white, and of the consistence of horn; their size nearly equals that of a grain of anise: they are enveloped in the body within a covering, branched all over with veins and arteries; and when excluded, they crack, on being pressed between the fingers: their substance within is a whitish, viscous, and transparent fluid. In this manner they remain deposited beneath the surface of the earth, during the whole winter, till the genial return of spring begins to vivify and hatch them. The sun, with its warmth, beginning to animate all nature, the insect eggs feel its benign influence; and generally, about the beginning of May, every egg produces an insect, about the size of a flea. These at first are of a whitish colour; at the end of two or three days they turn black, and soon after they become of a reddish brown. They appear, from the beginning, like grasshoppers wanting wings, and hop among the grass, as soon as excluded, with great agility.

The grasshopper, that for above twenty days from its exclusion has continued without the use of its wings, which were folded up to its body, at length prepares for its emancipation, and for a life of greater liberty and pleasure. To make the proper dispositions for the approaching change, it ceases from its grassy food, and seeks about for a convenient place, beneath some thorn or thistle, that may protect it from an accidental shower. The same laborious writhings and workings, heavings and palpitations, which we have remarked in every other insect upon an approaching change, are exhibited in this. It swells up his head and neck, it then seems to draw them in again, and thus alternately, for some time, it exerts its powers to get free. At length, the skin covering the head and breast is seen dividing above the neck, the head is seen issuing out first from the bursting skin; the efforts still continuing, the other parts follow successively, so that the little animal, with its long feelers, legs and all, works its way from the old skin, that remains fixed to the thistle or the thorn. It is, indeed, inconceivable how the insect can thus extricate itself from so exact a sheath as that which covered every part of its body.

The grasshopper, thus disengaged from its outer skin, appears in its perfect form; but then so feeble, and its body so soft and tender, that it may be molded like wax. It is no longer of that obscure colour which it exhibited before, but a greenish white, which becomes more vivid as the moisture on the surface is dried away. Still, however, the animal continues to show no signs of life, but appears quite spent and fatigued with its labour for more than an hour together. During this time, the body is drying, and the wings unfolding to their greatest expansion; and the curious observer will perceive them, fold after fold, opening to the sun, till at last they become longer than the two hinder legs. The insect's body also is lengthened during this operation, and it becomes much more beautiful than before.

These insects are generally vocal in the midst of summer; and they are heard at sun-setting much louder than during the heat of the day. They are fed upon grass, and, if their belly be pressed, they will be seen to return the juices of the plants they have last fed upon. Though unwilling to fly, and slow in flight, particularly when the weather is moist or cool, they are sometimes seen to fly to considerable distances. If they are caught by one of the hinder legs, they quickly disengage themselves from it, and leave the leg behind them. This, however, does not grow again, as with crabs or spiders; for as they are animals but of a single year's continuance, they have not sufficient time for repairing those accidental misfortunes. The loss of their leg also prevents them from flying; for, being unable to lift themselves in the air, they have not room upon the ground for the proper expansion of their wings. If they be handled roughly, they will bite very fiercely; and when they fly, they make a noise with their wings. They generally keep in the plain, where the grass is luxuriant, and the ground rich and fertile: there they deposit their eggs, particularly in those cracks which are formed by the heat of the sun.*

Such are the habits and nature of those little vocal insects, that swarm in our meadows, and enliven the landscape. The larger kinds only differ from them in size, in rapidity of flight, and the powers of injuring mankind, by swarming upon the productions of the earth. The quantity of grass which a few grasshoppers that sport in the fields can destroy is trifling; but when a swarm of locusts, two or three miles long, and several yards deep, settle upon a field, the consequences are frightful. The annals of every country are marked with the devastation which such a multitude of insects produces; and though they seldom visit Europe in such dangerous swarms as formerly, yet, in some of the southern kingdoms, they are still formidable. Those which have at uncertain intervals visited Europe, in our memory, are supposed to have come from Africa, and the animal is called the great brown locust. It was seen in several parts of England in the year 1748, and many dreadful consequences were apprehended from its appearance. This insect is about three inches long, and has two horns or feelers, an inch in length. The head and horns are of a brownish colour, it is blue about the mouth, as also on the inside of the larger legs. The shield that covers the back is greenish, and the upper side of the body brown, spotted with black, and the under side purple. The upper wings are brown, with small dusky spots, with one larger at the tips; the under wings are more transparent, and of a light brown, tinctured with green, but there is a dark cloud of spots near the tips. This is that insect that has threatened us so often with its visitations, and that is so truly terrible in the countries where it is bred. There is no animal in the creation that multiplies so fast as these, if the sun be warm, and the soil in which their eggs are deposited be dry. Happily for us, the coldness of our climate, and the humidity of our soil, are no way favourable to their production; and as they are but the animals of a year, they visit us and perish.

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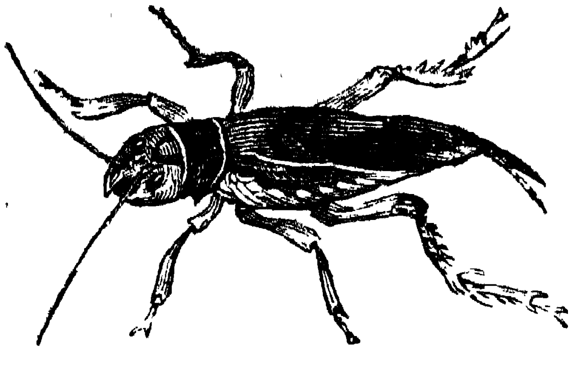
* Destruction of Grasshoppers' Eggs.—Last year the Pacha of Egypt offered a reward, for all the grasshoppers' eggs that should be delivered to him, of 17 piastres per measure. By a letter from Acre, it appeared that in October last 40 garavas of 72 measures each had been sent in. The total quantity of eggs, estimated as above, would be worth 46,000 piastres to those who collected them, or about 40,000*l.*—Asiatic Journal.


(The Membranous Locust.)

The Scripture, which was written in a country where the locust made a distinguished feature in the picture of nature, has given us several very striking images of this animal's numbers and rapacity. It compares an army, where the numbers are almost infinite, to a swarm of locusts: it describes them as rising out of the earth, where they are produced; as pursuing a settled march to destroy the fruits of the earth, and co-operate with divine indignation.*

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* The Locust.—Dr. Clarke, in his Travels in Tartary, on approaching Cuffa, thus notices the number of locusts.

"We now began to perceive the truth of those surprising relations which we had often heard and read concerning the locust in countries infested with that insect. The *steppes* were entirely covered by their bodies; and their numbers falling, resembled flakes of snow, carried obliquely by the wind, and spreading a thick mist over the sun. Myriads fell over the carriage, the horses, and the drivers. The stories of these animals, told us by the Tartars, were more marvellous than any we had before heard. They said that instances had occurred of persons being suffocated by a fall of locusts in the *steppes*. It was now the season, they further added, in which their numbers began to diminish. When they first make their appearance, a thick dark cloud is seen very high in the air, which, as it passes, obscures the sun. I had always supposed the stories of the locust to exaggerate their real appearance; but found their swarms so astonishing in all the *steppes* over which we passed in this part of our journey, that the whole face of nature might have been described as concealed by a living veil. They were of two kinds; the *gryllus Tartaricus*, and the *gryllus migratorius*, or common migratory locust. The first is almost twice the size of the second, and since it precedes the other, bears the name of the herald or messenger. The migratory locust has red legs, and its inferior wings have a lively red colour, which gives a bright fiery appearance to the animal when fluttering in the sun's rays. The strength of limbs possessed by it is amazing: when pressed down by the hand upon a table, it has almost power to raise the fingers; but this force resides wholly in the legs; for if one of these be broken off, which happens by the slightest accident, the power of action ceases. There is yet a third variety of locust, *gryllus viridissimus* of Linnæus, found near the Don and the Kuban, which is entirely of a green colour. This last I have since seen upon the banks of the Cam in my own country, and felt for the moment intimidated, lest such a presage should be the herald of the dreadful scourge which the locust bears wherever it abounds. On whatever spot these animals fall, the whole vegetable produce disappears. Nothing escapes them, from the leaves of the forest to the herbs of the plain. Fields, vineyards, gardens, pastures, everything is laid waste; and sometimes the only appearance left upon the naked soil is a disgusting superficies caused by their putrefying bodies, the stench of which is sufficient to breed a pestilence."

Ravages of Locusts.—When Captains Irby and Mangles were travelling round the

It would be endless to recount all the mischiefs which these famished insects have at different times occasioned; but what can have induced them to take such distant flights, when they come into Europe, is not so easily to be accounted for. It seems most probable, that by means of a very dry season in the heart of Africa, they are propagated in such numbers, that the vegetables of the spot where they are produced are not sufficient to sustain them. Thus being obliged to find out other countries, they traverse the sandy deserts, where they can find no sustenance; still meeting with nothing to allure them from their height, they proceed forward across the sea, and thus come into Europe, where they alight upon the first green pastures that occur.*

In some parts of the world, the inhabitants turn what seems a plague to their

southern extremity of the Dead Sea, in the end of May, they had an opportunity of observing these insect depredators. "In the morning," say they, "we quitted Shobek. On our way we passed a swarm of locusts that were resting themselves in a gully; they were in sufficient numbers to alter apparently the colour of the rock on which they had alighted, and to make a sort of crackling noise while eating, which we heard before we reached them. Volney compares it to the foraging of an army. Our conductors told us they were on their way to Gaza, and that they pass almost annually."

Even our own island has been alarmed by the appearance of locusts, a considerable number having visited us in 1748; but they happily perished without propagating. Other parts of Europe have not been so fortunate. In 1650, a cloud of locusts were seen to enter Russia in three different places; and they afterwards spread themselves over Poland and Lithuania in such astonishing multitudes, that the air was darkened, and the earth covered with their numbers. In some places they were seen lying dead, heaped upon each other to the depth of four feet; in others they covered the surface of the ground like a black cloth: the trees bent with their weight, and the damage the country sustained exceeded computation. They have frequently come also from Africa into Italy and Spain. In the year 591 an infinite army of locusts, of a size unusually large, ravaged a considerable part of Italy, and being at last cast into the sea, (as seems for the most part to be their fate,) a pestilence, it is alleged, arose from their stench, which carried off nearly a million of men and beasts. In the Venetian territory, likewise, in 1478, more than 30,000 persons are said to have perished in a famine chiefly occasioned by the depredations of locusts.—Insect Transformation.

On the Rapid Flight of Insects.—In passing along the Manchester and Liverpool railway, at a speed of about twenty-four miles an hour, ascertained by a stop-watch, I observed one of the smaller humble-bees, I think the *apis subinterrupta*, flying for a considerable distance and keeping pace with the train apparently without the slightest effort; in fact, the little traveller was going at a rate far more rapid than ours, for its accompaniment was not in a straight line, but in that well-known zigzag mode of flight observable when these insects are hovering from flower to flower in search of food. Several house, blue-bottle, and horse flies were also repeated visiters: our rapid motion seemed to have no manner of effect upon them, for when it suited their purpose they darted onwards, for a few feet or yards, or balanced themselves steadily over any given point; though in an instant, whenever either their efforts relaxed, or they thought it expedient to part company, they were far away in our rear. I should observe, moreover, that the wind at the time was blowing obliquely against us with a current of such strength, that I occasionally had some difficulty in keeping my hat on. Under all circumstances, therefore, of the wind's opposition and their irregular motion, I considered that the locomotive powers of these insects could not be well less than from thirty to forty miles an hour. Compared with the beautifully arranged muscular powers of these minute beings in the creation, how insignificant are those which science, with all its advantages, has hitherto been able to accomplish by mechanical means.—Phil. Mag.

* Mode of Dispersing Locusts.—We traversed the grand *steppe* or desert of Astrakhan for two days. On the evening of the 1st of August, we arrived at a Russian village, which was surrounded by a considerable tract of well-cultivated land. While changing horses, I witnessed what was to me a very curious sight—a vast flight of locusts, extending fifteen miles, suddenly made their appearance from the east, and came in a huge phalanx to attack the crops. In an instant every villager was on the road to his own field. Some took dogs, others were on horseback, and others ran shouting and clapping their hands all the way, the inhabitants finding from experience that the locusts very much dislike noise. My fellow-traveller told me, that in the colony of Karass, when the locusts come in sight, not only all the inhabitants, but the military turn out, and endeavour to drive them off, by drums and fifes, and a perpetual discharge of musketry. The

own advantage. Locusts are eaten by the natives in many kingdoms of the east, and are caught in small nets provided for that purpose. They parch them over the fire in an earthen pan, and when their wings and legs are fallen off, they turn reddish, of the colour of boiled shrimps. Dampier has eaten them thus prepared, and thinks them a tolerable dish. The natives of Barbary also eat them fried with salt; and they are said to taste like cray-fish.

There is a locust in Tonquin, about the bigness of the top of a man's finger, and as long as the first joint. It breeds in the earth, in low grounds; and in the months of January and February, which is the season for taking them, they issue from the earth in vast swarms. At first they can hardly fly, so that they often fall into the rivers in great numbers: however, the natives in these months watch the rivers, and take them up in multitudes in small nets. They either eat them fresh, broiled on the coals, or pickle them for keeping. They are considered as a great delicacy in that part of the world, as well by the rich as the poor. In the countries where they are eaten, they are regularly brought to market, and sold as larks or quails in Europe. They must have been a common food with the Jews, as Moses, in the book of Leviticus, permits them to eat four different kinds of this animal, which he takes care to specify. This dish, however, has not yet made its way into the kitchens of the luxurious in Europe; and though we may admire the delicacies of the east, we are as yet happily deprived of the powers of imitation.*

Of all animals, however, of this noxious tribe, the great West Indian locust, individually considered, is the most formidable. It is about the thickness of the barrel of a goose-quill, and the body is divided into nine or ten joints, in the whole about six or seven inches long. It has two small eyes, standing out of the head like those of crabs, and two feelers like long hairs. The whole body is studded with small excrescences, which are not much bigger than the points of pins. The shape is roundish, and the body diminishes in circumference to the tail, which is forked into two horns. Between these, there is a sort of a sheath, containing a small, dangerous sting. If any person happens to touch this insect he is sure to be stung; and is immediately taken with a shivering and trembling, all over the body, which, however, may soon be put a stop to, by rubbing the place that was affected with a little palm oil.

From the locust we descend to the cricket, which is a very inoffensive and pretty animal. Though there be a species of this insect that lives entirely in the woods and fields, yet that with which we are best acquainted is the house-

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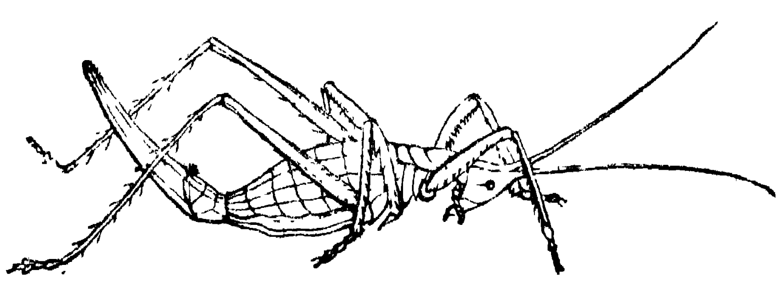
enemy, thus repulsed, make a speedy retreat, and commit their depredations on the land of those who are less on the alert to resist them. —Capt. Keppel's Travels.



(The New Locust.)

* New Locust. —A notice appears to have been read to the Imperial Society of Naturalists in Moscow, at its sitting immediately following the election of its new president, Prince Galitzin; and is published principally, perhaps, as a specimen of a large work on the orthopterous insects of Russia, preparing by M. Fischer de Waldheim, the learned director of that society. The memoir contains the announcement of a new genus (*tettigôpsis*) belonging to the family of locusts, the characters of which are given in detail, and four species described. Of these, one, brought from the *steppes* near Sarpa, is considered new and rare. The annexed outline reduced one half from the original figure, will convey a distinct idea of the general appearance of the insect to our readers.—Magazine Nat. Hist.

cricket, whose voice is so well known behind a country fire in a winter's evening.* There is something so unusual in hearing a sound while we do not see the animal producing it, nor discover the place from whence it comes, that among the country people the chirping of the cricket is always held ominous; and whether it deserts the fire-side, or pays an unexpected visit, the credulous peasantry always find something to be afraid of. In general, however, the killing of a cricket is considered as a most unlucky omen; and though their company is not much desired, yet no methods must be taken to remove them.

The cricket very much resembles the grasshopper in its shape, its manner of ruminating, its voice, its leaping, and methods of propagation. It differs in its colour, which is uniformly of a rusty brown; in its food, which is more various; and in its place of residence, which is most usually in the warmest chinks behind a country hearth. They are, in some measure, obliged to the bad masonry employed in making peasants' houses for their retreats. The smallest chink serves to give them shelter; and where they once make their abode they are sure to propagate. They are of a most chilly nature, seldom leaving the fire-side; and, if undisturbed, are seen to hop from their retreats to chirrup at the blaze in the chimney.† The wood-cricket is the most timorous animal in nature; but the chimney-cricket, being used to noises, disregards not only those, but the appearance of people near it. Whether the voice of this animal is formed in the same manner with that of the grasshopper, by a fine membrane at the base of the wings, which is moved by a muscle, and which being coiled up, gives a sound like a quail-pipe, is not yet ascertained; nor do we well know the use of this voice, since anatomical inspection has not been able to discover the smallest organs of hearing. Still, however, we can make no doubt of their power of distinguishing sounds, though probably not in the same manner with the more perfect ranks of nature. Certain it is that I have often heard them call, and this call was as regularly answered by another, although none but the males are vocal.

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* The House-cricket.—

> Far from all resort of mirth,
> Save the cricket on the earth.
>
> *Il Penseroso.*

White, in his Selborne, has the following interesting chapter on this little insect:

While many other insects must be sought after in fields, and woods, and waters, the *gryllus domesticus*, or house-cricket, resides altogether within our dwellings, intruding itself upon our notice whether we will or not. This species delights in new-built houses, being, like the spider, pleased with the moisture of the walls, and, besides, the softness of the mortar enables them to burrow and mine between the joints of the bricks or stones, and to open communications from one room to another. They are particularly fond of kitchens and bakers' ovens, on account of their perpetual warmth.

Tender insects that live abroad either enjoy only the short period of one summer, or else doze away the cold uncomfortable months in profound slumbers; but these, residing as it were in a torrid zone, are always alert and merry; a good Christmas fire is to them like the heats of the dog-days. Though they are frequently heard by day, yet is their natural time of motion only in the night. As soon as it grows dusk, the chirping increases, and they come running forth, and are from the size of a flea to that of their full stature. As one should suppose, from the burning atmosphere which they inhabit, they are a thirsty race, and show a great propensity for liquids, being found frequently drowned in pans of water, milk, broth, or the like. Whatever is moist they affect; and, therefore, often gnaw holes in wet woollen stockings and aprons that are hung to the fire; they are the housewife's barometer, foretelling her when it will rain; and are prognostics sometimes, she thinks, of ill or good luck; of the death of a near relation, or the approach of an absent lover. By being the constant companions of her solitary hours, they naturally become the objects of her superstition. These crickets are not only very thirsty, but very voracious; for they will eat the scummings of pots, and yeast, salt, and crumbs of bread, and any kitchen offal or sweepings. In the summer we have observed them to fly, when it became dusk, out of the windows, and over the neighbouring roofs. This feat of activity accounts for the sudden manner in which they often leave their haunts, as it does for the method by which they come to houses where they were not known before. It is remarkable, that many sorts of insects seem never to use their wings but when they have a mind to shift their quarters and settle new colonies. When in the air, they move *volatu undoso*, in waves, or curves, like woodpeckers, opening and shutting their wings at every stroke, and so are always rising or sinking.

When they increase to a great degree, as they did once in the house where I am now writing, they become noisome pests, flying into the candles, and dashing into people's faces; but may be blasted and destroyed by gunpowder discharged into their crevices and crannies. In families, at such times, they are, like Pharaoh's plague of frogs, "in their bed-chambers, and upon their beds, and in their ovens, and in their kneading-troughs." Their shrilling noise is occasioned by a brisk attrition of their wings. Cats catch hearth-crickets, and, playing with them as they do with mice, devour them. Crickets may be destroyed, like wasps, by phials half filled with beer, or any liquid, set in their haunts; for, being always eager to drink, they will crowd in till the bottles are full.—Natural History of Selborne.

† Hybernation of the Cricket.—The following observations on this subject by Mr

As the cricket lives chiefly in the dark, so its eyes seem formed for the gloominess of its abode; and those who would surprise it, have only to light a candle unexpectedly, by which it is dazzled, and cannot find the way back to its retreat. It is a very voracious little animal, and will eat bread, flour, and meat; but it is particularly fond of sugar. They never drink, but keep for months together at the back of the chimney, where they could possibly have had no moisture. The warmth of their situation only serves to increase their mirth and loquacity. Except in the very coldest weather they never cease their chirruping, but continue that little piercing note, which is as pleasing to some as it is disagreeable to others. The great Scaliger was particularly delighted with the chirruping of crickets, and kept several of them for his amusement, inclosed in a box, which he placed in a warm situation. Others, on the contrary, think there is something ominous and melancholy in the sound, and use every endeavour to banish this insect from their houses. Ledelius tells us of a woman who was very much incommoded by crickets, and tried, but in vain, every method of banishing them from her house. She at last accidentally succeeded; for, having one day invited several guests to her house, where there was a wedding, in order to increase the festivity of the entertainment, she procured drums and trumpets to entertain them. The noise of these was so much greater than what the little animals were used to, that they instantly forsook their situation, and were never heard in that mansion more.

But of all the cricket kind, that which is called the mole-cricket is the most extraordinary. This animal is the largest of all the insects with which we are acquainted in this country, being two inches and a half in length, and three-quarters of an inch in breadth. The colour is of a dusky brown; and at the

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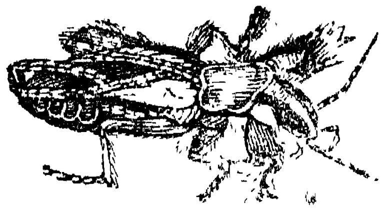
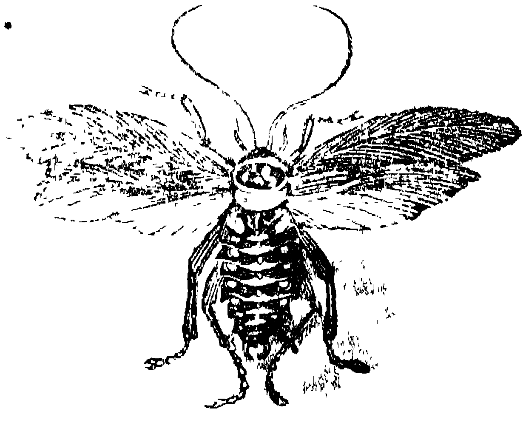
Gough, of Manchester, are curious and interesting. "Those," says he, "who have attended to the manners of the hearth-cricket (*acheta domestica*) know that it passes the hottest part of the summer in sunny situations, concealed in the crevices of walls and heaps of rubbish. It quits its summer abode about the end of August, and fixes its residence by the fire-side of kitchens or cottages, where it multiplies its species, and is as merry at Christmas as other insects in the dog-days. Thus do the comforts of a warm hearth afford the cricket a safe refuge, not from death, but from temporary torpidity, which it can support for a long time, when deprived by accident of artificial warmth.—I came to the knowledge of this fact," continues Mr. Gough, "by planting a colony of these insects in a kitchen, where a constant fire was kept through the summer, but which is discontinued from November till June, with the exception of a day once in six or eight weeks. The crickets were brought from a distance, and let go in this room, in the beginning of September, 1806; here they increased considerably in the course of two months, but were not heard or seen after the fire was removed. Their disappearance led me to conclude that the cold had killed them; but in this I was mistaken, for a brisk fire being kept up for a whole day in the winter, the warmth of it invited my colony from their hiding-place, but not before the evening; after which they continued to skip about and chirp the greater part of the following day, when they again disappeared, being compelled by the returning cold, to take refuge in their former retreats. They left the chimney corner on the 25th of May, 1807, after a fit of very hot weather, and revisited their winter residence on the 31st of August. Here they spent the summer merely, and lie torpid at present (January 1808) in the crevices of the chimney, with the exception of those days on which they are recalled to a temporary existence by the comforts of a fire."—REEVE, ESSAY ON THE TORPIDITY OF ANIMALS.

extremity of the tail there are two hairy excrescences, resembling in some sense the tail of a mouse. The body consists of eight scaly joints or separate folds, is brown on the upper part, and more deeply tinged below. The wings are long, narrow, and terminate in a sharp point, each having a blackish line running down it: however, when they are extended, they appear to be much broader than could at first sight be supposed. The shield of the breast is of a firm texture, of a blackish colour and hairy. The fore-feet, which are this animal's principal instruments of burrowing into the earth, are strong, webbed, and hairy; it generally, however, runs backward; but it is commonly under ground, where it burrows even faster than a mole. It is thought also to be amphibious, and capable of living under water, as well as under ground.*


(The Mole-cricket.)

Of all insects this is the most detested by gardeners, as it chiefly resides in that ground which lies light, and where it finds sufficient plenty under the surface. Thus, in a single night's time, it will run along a furrow which has been newly sown, and rob it of all its contents. Its legs are formed in such a manner that it can penetrate the earth in every direction; before, behind, and above it. At night it ventures from its under-ground habitation, and, like the cricket, has its chirping call. When the female is fecundated, she makes a cell of clammy earth, the inside of which is large enough to hold two hazle-nuts, and in this she lays her eggs. The whole nest is about the size of a common hen's egg, closed up on every side, and well defended from the smallest breath of air. The eggs generally amount to the number of a hundred and fifty, being white, and about the size of a carraway comfit. They are thus carefully covered, as well to defend them from the injuries of the weather, as from the attacks of the black beetle; that being itself an under ground inhabitant, would, but for this precaution, devour or destroy them. To prevent this, the female mole-cricket is often posted as a sentinel near the nest, and when the black invader plunges in to seize its prey, the guardian insect seizes him behind, and instantly bites him in two.

Nothing can exceed the care and assiduity which these animals exhibit in the preservation of their young. Wherever the nest is placed, there seems to be a fortification, avenues and intrenchments, drawn round it: there are numberless winding ways that lead to it, and a ditch drawn about it, which few of its insect enemies are able to pass. But their care is not confined to this only; for, at the approach of winter, they carry their nest entirely away, and sink it deeper in the ground, so that the frost can have no influence in retarding the young brood from coming to maturity.† As the weather grows milder, they raise


(The Gigantic Cock Roach.)

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* Mole-crickets —Anatomists who have examined the intestines of these insects, astonish me with their accounts; for they say, that from the structure, position, and number of their stomachs or maws, there seems to be good reason to suppose that this, and the two former species, ruminate, or chew the cud, like many of the quadrupeds."—White, Nat Hist Selborne

† The Eggs of Insects.—It is surprising the degree of cold which the eggs and chrysalids of insects can endure, without destroying

We may also add the Water Scorpion, which is a large insect, being near an inch in length, and about half an inch in breadth. Its body is nearly oval, but very flat and thin, and its tail long and pointed. The head is small, and the

said to outnumber all that the earth produces, and is of importance should be brought under the notice of the young naturalist.

Luminousness of the Sea.—An exceedingly interesting paper upon this phenomenon will be found in the *Magazine of Natural History* (No. 14, July 1830,) it was originally read before the Plinian Society, by W. Baird, Esq., an ingenious member. The contribution occupies nearly a sheet or 16 pages, of the Magazine, and is abundantly illustrated with wood engravings. Some of them, the writer thinks, represent new species of the animals which produce this ocean-light: we can, however, only quote one of his engravings, and its accompanying explanations.

In addition to these animals (all of which may be perhaps referred to the Medūsa and Actinia tribe), there occurred two other bodies of a different figure and construction, and apparently animals. The first of these (see the cut *a*) occurred in considerable quantity, especially in the Straits of Malacca and in the Java Sea; and though I cannot say I observed these bodies distinctly luminous, they seldom occurred except at such times as when the sea was vividly so. They are composed of a series of short, oval, hollow tubes, quite transparent, finely jointed to each other by a narrow neck, and so exceedingly brittle that it was impossible to obtain anything but fragments for examination. About the centre of each tube or division there appeared a dent or depression, marked by a dark line, and in this hollow lay a small, round body like an ovum. Nearer the extremities, also, were to be seen a number of small round bodies, shaped like nails, and pretty regularly disposed. In some, as in *a*, the tubes or joints seemed almost detached from each other, except where they were united by a small point. In others, as in *b*, they seemed to enter each other by a sharp point at the extremity: this difference most probably arising from the position of the objects while under examination. The natural size of each joint appeared to be not larger than a grain of sand. The other body, *c*, only occurred once to me, and it appeared also to be a fragment. It was coiled round in a circular manner like a snake, not forming a perfect circle, as the extremities, which were both open, did not meet. Through its whole length it was separated into a great many divisions or short tubes, each band of division or septum being double, and each division containing a dark spot in its centre like an ovum. Natural size about the sixth of an inch in circumference.

These eight species of animals all belong to the acalēpha of Cuvier; but there are other animals, more perfect and of a higher organization, which have also been found to produce this luminousness in the sea. Several of these I have already mentioned, as two or three species of cancer, &c.; but there are also a good many of the crustàcea, belonging to the order Entomóstraca of Muller, which possess this property.

One of these Entomóstraca, which occurred several times and in considerable abundance when the sea was most luminous, is figured in *d*. The head and body are in one, flat, of an oval shape; tail double, each portion terminated by a fasciculus of fine hairs; antennæ two, linear, armed with hairs or bristles on both sides, which point forwards; eyes two, situated laterally and near the upper part of the body. Near the lower extremity of the body, close to the tail, were two dark substances projecting outwards, most probably the ovaries. The body of the animal was quite transparent and showed the viscera and the red blood in motion; natural size a grain of sand. This little animal bears a considerable resemblance to one of Muller's figures, a species of cyclops; but as that genus is characterized as having only one eye, and as I made out distinctly two in this specimen, I cannot, till another opportunity occurs of farther examination, refer it to that genus. Two other little creatures, however, occurred, which I have no hesitation in referring to the cyclops of Muller (*e* and *f*.) One or two species have been ascertained, by Sir C. Giesecké in Greenland, to be luminous, and Dr Macculloch has added thirty-three new species in our own seas, all of them highly luminous. The first of these which I have represented, *e*, is an exceedingly nimble little creature; and, not being larger than a pin's point, it required great attention to be able to follow its movements. The body is of an oval shape, divided into five segments; antennæ two, linear, covered with prickles or hairs, and fully the length of the body; feet about five on each side; tail double, each division terminated by a number of fine hairs; eye, one; the round spots on the upper surface of the body are ova. This species somewhat resembles the C. rùbens of Muller (Entomóstraca, tab. xvi. fig 3); it is, however, a very distinct species. *f* is also a cyclops, possessing great rapidity of motion, and almost eluding observation as it darts through the water; body oblong, divided into six segments; tail consisting of two long, fine hairs or setæ, fully the length of the body of the animal; eye, one; antennæ two, linear; feet feelers appear like legs, resembling the claws of a scorpion, but without sharp points. This insect is generally found in ponds, and is, of all others, the most tyrannical and rapacious. It destroys, like a wolf among sheep, twenty times

with setæ; feet, about five on each side; a very distinct species from the last, and very different from any of Muller's. *c* is the more common of the two, occurring in the Atlantic, Straits of Malacca, &c: *f* I only observed in the Straits of Malacca. *g* belongs to a different genus altogether; head and body in one; very obtuse at the upper extremity, and gradually tapering towards the tail, which consists of two divisions, each terminated by a cluster of fine setæ; eyes two, lateral and inferior. From under these, on each side, are projected two short antennæ. I could only see this animal in a prone situation, and on that account could only see two legs near his lower extremity. The colour of this curious little creature was of a beautiful silvery hue, with a pearly lustre, the body was transparent, and his viscera and red blood could be distinctly seen in constant motion. Natural size, a grain of sand, found in the Straits of Malacca. *h* is an exceedingly minute animal, but not possessing such celerity of motion as several of the last mentioned; head rather large and obtuse, body oval, connected to the head by a narrower portion, or neck; eyes, two; antennæ four, the inferior of the two shorter than the upper ones; no tail, lower extremity of the body emarginate; body hairy; natatory feet collected into three clusters on each side, nearly half the length of the body. This animal was quite transparent, and in the upper part of the body the mouth could be distinctly seen, of an oval shape, opening and shutting at the will of the animal. Habitat, Straits of Malacca.

These little animals are extremely interesting in many respects; but there was one which I observed still more so than any other yet described, not from his motions, which were surpassed in quickness by the cyclops, nor from his colour, which was far exceeded by *g*, but from his animal economy and the curious provisions with which he is endowed for catching his food. This extremely interesting little animal is represented in *i*, and appears to belong to the same genus as the last. Body oblong, divided into five segments, the upper one the largest, the lower one oval, and smaller than the rest; head large and obtuse; eyes, two; antennæ four, two on each side, one much shorter than the other; natatory feet consisting of four clusters, two on each side, as long as the body of the animal, which was covered at the sides with long hairs. On each side, about the middle of the head, and also on each side of the last segment of the body, or what, perhaps, may be termed the tail, there is attached a circular fasciculus of fine short hairs; the body being quite transparent, the mouth and viscera could be plainly seen. Its motion was rather slow, the long hairs composing its natatory feet were gently put in motion, so as slowly and gracefully to carry him a short distance through the water; he would then stop, and immediately set the circular fasciculi of short hairs already mentioned, at his upper and lower extremities, in motion, which was so exceedingly rapid as at first to escape detection. This very quick circular motion produced a regular whirlpool in the water around him, which extended in a very short time to a considerable distance, the mouth of the animal forming the centre of the vortex. The objects all round about were thus put in motion, and sucked into the part where his mouth is situate, which at such times was constantly and rapidly contracting and dilating, swallowing some objects and rejecting others, the viscera at the same time having evidently a strong vermicular motion. It appeared to be very rapacious, as the whole time it was under the microscope it seemed to be almost constantly in search of food. Found in the Straits of Malacca.

I have still two other animals to describe, belonging, however, to different classes from the last mentioned. The one (*k*) is evidently a planaria, in its motion very much resembling the leech: natural size, a grain of sand; colour, white; found in the Straits of Malacca. The other (*l*) belongs to a genus unknown to me. It is exceedingly nimble in its motions; the head, which is rather large and unshapely, was enveloped in a membraneous bag, which seemed also extended over the whole body. It was quite transparent, the body spotted with bars of a dark colour. Found in the South Atlantic Ocean.

In drawing up this paper for the society, I have not gone to any length to endeavour to *prove* that the luminousness of the sea is caused solely by the presence of animalcules, and this for the following reason, viz., that there scarcely now exists a doubt upon the subject. Any arguments which I could have produced may be found much better expressed and more forcibly illustrated by referring to Dr. Macculloch and Mr. Macartney.

Mr. Baird concludes with these sensible observations:—It is an opinion held by sailors, and which is to be found as having prevailed amongst that class of people from the earliest times, that the luminousness of the sea is a forerunner of stormy weather; and this opinion has even been taken up and defended by several authors, who have written upon this subject. The fact of the matter is.

their magazine in proportion, till at last they bring it as near the surface as they can, to receive the genial influence of the sun, without wholly exposing it to view; yet, should the frost unexpectedly return, they sink it again as before.

CHAP. V.

THE EARWIG, THE FROTH INSECT, AND SOME OTHERS BELONGING TO THE SECOND ORDER OF INSECTS.

We should still keep in memory that all insects of the second order, though not produced quite perfect from the egg, yet want very little of their perfection, and require but a very small change to arrive at that state which fits them for flight and generation. The natural functions in these are never suspended: from the instant they leave the egg, they continue to eat, to move, to leap, and pursue their prey: a slight change ensues, a skin that inclosed a part of their body and limbs, bursts behind, like a woman's stays, and gives freedom to a set of wings, with which the animal expatiates, and flies in pursuit of its mate.

Of all this class of insects, the earwig undergoes the smallest change.* This animal is so common, that it scarce needs a description: its swiftness in the reptile state is not less remarkable than its indefatigable velocity when upon the wing. That it must be very prolific, appears from its numbers; and that it is very harmless, every one's experience can readily testify. It is provided with six feet, and two feelers: the tail is forked, and with this it often attempts to defend itself against every assailant. But its attempts are only the threats of impotence; they draw down the resentment of powerful animals, but no way serve to defend it. The deformity of its figure, and its slender make, have also subjected it to an imputation, which, though entirely founded in prejudice, has more than once procured its destruction. It is supposed, as the name imports, that it often enters into the ears of people sleeping, thus causing madness, from

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the vital principle; nor is it less astonishing the degree of heat they are capable of sustaining. Spallanzani, and John Hunter, have made some curious experiments on these subjects. "Intense cold," says Spallanzani, "does not destroy the eggs of insects." The year 1709 was celebrated for the intensity of its cold, and its fatal effects on animals and plants. Fahrenheit's thermometer fell to one degree. "Who can believe," exclaims Boerhaave, "that the severity of this winter did not destroy the eggs of insects, especially those exposed to its influence in open fields, on the bare earth, or on the exposed branches of trees! Yet the genial warmth of spring having again tempered the air, these eggs were batched, and as numerously as in the mildest winters." Since that time there have been winters still more severe, for, in France, as well as in several other European states, in December, 1788, the thermometer fell considerably beneath that of 1709.—Nat. Hist. Selborne.

* The Earwig.—The name of this insect, in almost all European languages, has given it a character which causes a feeling of alarm even at the sight of it. Whether or not they ever did enter the human ear is doubtful,—that they might endeavour to do so, under the influence of fear, is more than probable; and this, perhaps, has been the origin of their name, and the universal prejudice against them. As it is said that anatomists deny the possibility of their deep or dangerous entrance into the ear, it is a pity that this is not generally known, as it might defend the constitutionally timid from unnecessary alarm, and give a more favourable idea of a part of animal creation, which forms a most necessary link in the chain of being.—Brande's Journal.

the intolerable pain, and soon after death itself. Indeed, the French name, which signifies the ear-piercer, urges the calumny against this harmless insect in very plain terms; yet nothing can be more unjust: the ear is already filled with a substance which prevents any insect from entering; and besides, it well lined and defended with membranes, which would keep out any little animal, even though the ear-wax were away. These reproaches, therefore, are entirely groundless: but it were well if the accusations which gardeners bring against the earwig were as slightly founded.* There is nothing more certain than that it lives among flowers, and destroys them. When fruit also has been wounded by flies, the earwig generally comes in for a second feast, and sucks those juices which they first began to broach. Still, however, this insect is not so noxious as it would seem; and seldom is found but where the mischief has been originally begun by others. Like all of this class, the earwig is hatched from an egg. As there are various kinds of this animal, so they choose different places to breed in: in general, however, they lay their eggs under the bark of plants, or in the clefts of trees, when beginning to decay. They proceed from the egg in that reptile state in which they are most commonly seen, and, as they grow larger, the wings bound under the skin begin to burgeon. It is amazing how very little room four large wings take up before they are protruded: for no person could ever conceive such an expansion of natural drapery could be rolled up in so small a packet. The sheath in which they are enveloped, folds and covers them so neatly, that the animal seems quite destitute of wings (*g*), and even when they are burst from their confinement, the animal, by the power of the muscles and joints which it has in the middle of its wings, can closely fold them into a very narrow compass. When the earwig has become a winged insect, it flies in pursuit of the female, ceasing to feed, and is wholly employed in the business of propagation. It lives, in its winged state, but a few days; and having taken care for the continuance of posterity, dries up, and dies, to all appearance consumptive.

To this order of insects we may also refer the Cuckow Spit, or Froth Worm, that is often found hid in that frothy matter which we find on the surface of plants. It has an oblong, obtuse body, and a large head, with small eyes. The external wings, for it has four, are of a dusky brown colour, marked with two white spots; the head is black. The spume in which it is found wallowing is all of its own formation, and very much resembles frothy spittle. It proceeds from the vent of the animal, and other parts of the body; and if it be wiped away, a new quantity will be quickly seen ejected from the little animal's body. Within this spume it is seen in time to acquire four tubercles on its back, wherein the wings are inclosed; these bursting, from a reptile it becomes a winged animal; and thus rendered perfect, it flies to meet its mate, and propagate its kind.

The Water Tipula also belongs to this class. It has an oblong, slender body, with four feet fixed upon the breast, and four feelers near the mouth. It has four weak wings, which do not at all seem proper for flying, but leaping only. But what this insect chiefly demands our attention for is, the wonderful lightness wherewith it runs on the surface of the water, so as scarcely to put it in motion. It is sometimes seen in rivers, and on their banks, especially under shady trees, and generally in swarms of several together.

The Common Water-fly also breeds in the same manner with those abovementioned. This animal is by some called the Notonecta, because it does not swim, in the usual manner, upon its belly, but on its back; nor can we help admiring that fitness in this insect for its situation, as it feeds on the under side of plants which grow on the surface of the water, and, therefore, it is thus formed with its mouth upwards, to take its food with greater convenience and ease.†

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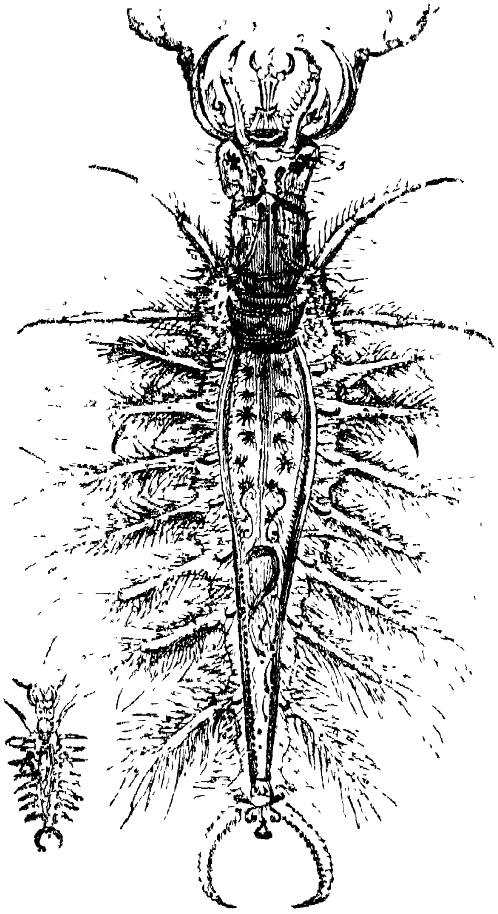
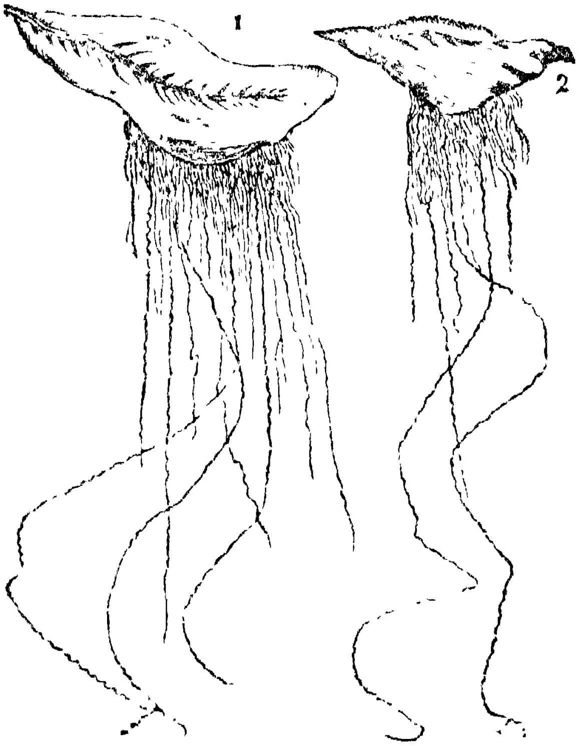
* A small insect, the harvest bug, does sometimes get into the ear, and produces a commotion but no real injury.—Ed.

† Marine Animalculæ.—Although not strictly referring to this class of insects, we may here observe on a species which may be

(*g*) Swammerdam, p. 114.



WATER DEVIL   Page [illegible]



PORTUGUESE MAN OF WAR INSECT   Page [illegible] as many as its hunger requires. One of these, when put into a basin of water, in which were thirty or forty worms of the libellula kind, each as large as itself, destroyed them all in a few minutes, getting on their backs, and piercing with its trunk through their body. These animals, however, though so formidable to others, are nevertheless themselves greatly overrun with a little kind of louse, about the size of a nit, which very probably repays the injury which the water-scorpion inflicts upon others.

The water-scorpions live in the water by day; out of which they rise in the dusk of the evening into the air, and so flying from place to place, often betake themselves, in quest of food, to other waters. The insect, before its wings are grown, remains in the place where it was produced; but when come to its state of perfection, sallies forth in search of a companion of the other sex, in order to continue its noxious posterity.*

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that very frequently these little animals seem, like many others of the animal kingdom, to be aware of the change of weather; and, instead of giving warning by their shining brighter at such times than they did before, they disappear altogether, no doubt taking refuge from the agitation of the waves by descending to a more secure situation deep in the water. And even when at times, as it no doubt occasionally does happen, the sea in bad weather is particularly luminous, it is evidently produced by large medusæ such as the M. pellucens of Sir J. Banks, and other large animals, and only takes place when the gale has already arrived, being nothing more than a concomitant, not the forerunner, of an agitated sea. From my own observations upon this subject, were I to say that it is at all connected with meteorological appearances, I should be disposed to believe that it is more brilliant and more generally diffused over the surface of the water, immediately before or during very light rain, not absolutely during a calm, but when there is only a gentle breeze at the time. I have frequently observed at such times the sea particularly luminous, and have also heard it remarked by seamen as a forerunner of rain. This, however, like every other prognostic, frequently fails, only showing how little all such prognostics are to be attended to.

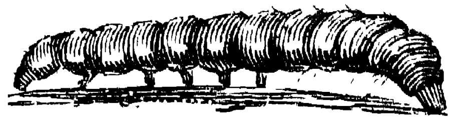
* PORTUGUESE MAN-OF WAR INSECT.—By aid of the *Magazine of Natural History*, we are enabled to present the reader with a figure of this curious creature. The writer of the subsequent description is a Correspondent of the above popular Journal.

In Stark's *Elements of Natural History* it will be found under the division Radiata, class Acaléphа: it is the Physalia, or Physalis pelagica, of *Lamarck*. When seen floating on the surface of the water, the most conspicuous part of the animal appears to be an oval subtrigonal membrane, inflated with air, having an elevated ridge running along its back like a cock's comb, strongly marked with indentations, and tinged along the summit of a beautiful rosy hue, the extremities of the inflated bladder being of a fine purple and violet colour. Underneath the membrane, and nearest to the larger extremity, are attached numerous appendages; some are very short and thick, while others are very long, many upwards of 20 inches in length. Some are straight, others twisted, and a few are spirally twisted, like the spring-wire of a bell. These appendages, according to Cuvier, form the suckers, tentacula, and ovaries (egg-bags), and are of a beautiful violet and blue colour, intermixed with purple. The smaller extremity is free, and the animal possesses the power of lifting it out of the water altogether; raising it aloft into the air, while the larger one is kept floating on the water by the weight of the fleshy appendages already mentioned. They have the power of contracting and dilating their membranous bag at pleasure, and no doubt, by trimming it to the wind, make it act the part of a sail to propel themselves through the water. "They are very often to be met with at sea," says Sir Hans Sloane; "and seamen do affirm that they have very great skill in sailing, managing their bladder or sail with judgment for this purpose, according to the different winds and courses." (*Sloane's Voyage to Jamaica*, vol i. p. 7.) Upon attentively examining the narrow or free extremity of the bladder, a small, round aperture is perceptible, surrounded by a circular zone of fibres, of a beautiful red colour, like the muscular fibres of the iris of the eye. Out of this small hole, which is not larger than would be sufficient to admit the passage of a very fine bristle, I squeezed the air out of the bladder. It is by this aperture that the animal, it is presumed, expels the air from the bladder, when he wishes to sink under the surface of the water; but whether he refills it, by inhaling the air by this aperture, or secrets it from his blood, is not so easily determined. They possess, in a high degree, the stinging quality which has procured for the animals belonging to the Radiata the term sea nettles. They are also endowed with the luminous property which belongs to so many marine animals; and it is observable, when they have been numerous during the day, that the sea at night has been brilliantly illuminated.—CORRESPONDENT OF THE MAGAZINE OF NATURAL HISTORY.

CHAP. I.

CATERPILLARS IN GENERAL.

If we take a cursory view of insects in general, caterpillars alone, and the butterflies and moths they give birth to, will make a third part of the number. Wherever we move, wherever we turn, these insects, in one shape or another, present themselves to our view. Some, in every state, offer the most entertaining spectacle; others are beautiful only in their winged form. Many persons, of which number I am one, have an invincible aversion to caterpillars, and worms of every species; there is something disagreeable in their slow, crawling motion, for which the variety of their colouring can never compensate. But others feel no repugnance at observing, and even handling them with the most atentive application.


(The Catepillar.)

There is nothing in the butterfly state, so beautiful or splendid as these insects. They serve, not less than the birds themselves, to banish solitude from our walks, and to fill up our idle intervals with the most pleasing speculations. The butterfly makes one of the principal ornaments of oriental poetry; but, in those countries, the insect is larger and more beautiful than with us.

The beauties of the fly may, therefore, very well excite our curiosity to examine the reptile. But we are still more strongly attached to this tribe, from the usefulness of one of the number. The silkworm is, perhaps, the most serviceable of all other animals; since, from its labours, and the manufacture attending it, near a third part of the world are clothed, adorned, and supported.

Caterpillars may be easily distinguished from worms or maggots, by the number of their feet; and by their producing butterflies or moths. When the sun calls up vegetation, and vivifies the various eggs of insects, the caterpillars are the first that are seen, upon almost every vegetable and tree, eating its leaves, and preparing for a state of greater perfection. They have feet both before and behind; which not only enable them to move forward by a sort of steps made by their fore and hinder parts, but also to climb up vegetables, and to stretch themselves out from the boughs and stalks, to reach their food at a distance. All of this class have from eight feet at the least, to sixteen; and this may serve to distinguish them from the worm tribe, that never have so many. The animal into which they are converted, is always a butterfly or a moth; and these are always distinguished from other flies, by having their wings covered over with a painted dust, which gives them such various beauty. The wings of flies are transparent, as we see in the common flesh fly; while those of beetles are hard, like horn: from such the wing of a butterfly may be easily distinguished; and words would obscure their differences.*

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* Cleanliness of Animals.—Mr. Rennie, in an interesting paper "On the peculiar habits of cleanliness in some Animals," has the following illustration in the grub of the glow-worm.

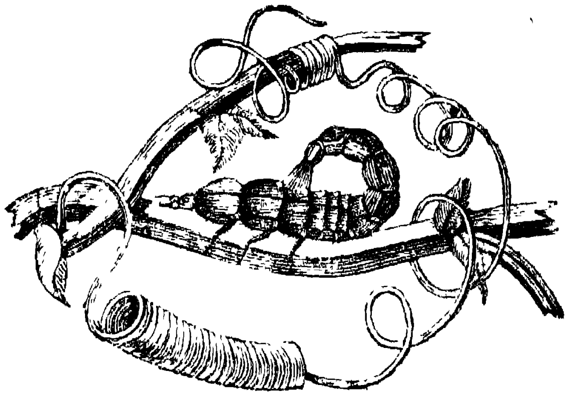
After watching it for some time (observes Mr. R.), my attention was drawn to some very singular movements which it made with its tail, and which the reader will understand better if he has observed how the common earwig, or the insect popularly called the devil's coach-horse (*Goerius olens*, Stephens), bends up its tail over its back, somewhat in the manner of a spaniel when it trips along well pleased before its master.

There appeared to be something so uncommon in these movements, that my curiosity was excited to observe them more minutely; and as the creature was not at all timid, I could easily observe it through a glass of some power. The caudal instrument I discovered, by this means, to consist of a double row of white cartilaginous rays, disposed in a circle, one row within the other; and, what

From hence it appears, that caterpillars, whether in the reptile state, or advanced to their last state of perfection into butterflies, may easily be distinguished from all other insects; being animals peculiarly formed, and also of a

was most singular, these were retractile, in a similar manner to the horns of the snail. The rays were united by a soft, moist, gelatinous membrane, but so as to be individually extensile, one or two being frequently stretched beyond the line of the others The rays were also capable of being bent as well as extended, and they could, therefore, be applied to the angles or depressions of an uneven surface.

It was not long before I convinced myself that this singular instrument was employed by the insect for cleaning itself; and it would have been difficult to devise anything more effectual for the purpose, though its action was different from all others of this kind with which I was acquainted, inasmuch as it operated by suction, and not as a comb, a brush, or a wiper, of which I shall mention some examples in the sequel. It was, moreover, furnished in the interior with a sort of pocket, of a funnel shape, formed by the converging rays, into which was collected whatever dust or other impurities were detached from the body, till it could hold no more, when, by a vermicular movement of the rays, the accumulated pellet was extruded, and placed with great care in some place where it might be out of the way of again soiling the glossy skin of the insect. This skin, if I may call it so, was of a soft, leathery appearance; exhibiting, when magnified, a minute, delicate dotting, similar to shagreen—but to the naked eye this was not apparent.



(Larva of the glow-worm on a tendrilled branch, using its cleaning instrument.)

The instrument just described, accordingly, when expanded over a portion of this shagreened surface, was subsequently drawn out, with an evident effort (repeated, if necessary), in the same way as boys draw their moist leather suckers, when they amuse themselves in dragging stones after them. Every particle of dust, or other extraneous matter, is thus detached from the skin, and, by a peculiar movement of the retractile rays, is lodged in the funnel-shaped pocket.

This singular instrument is also used for the very different purpose of assisting the animal to walk, and particularly to maintain a position against gravity, which its feet are ill calculated to effect.

Though not directly connected with my immediate subject, it may be interesting to many readers to mention that the above grub distinctly proved the fallacy of the common doctrine respecting the light of the glow-worm, which goes to maintain that it is a lamp, lit up by the female, to direct the darkling flight of the male. "Ce sont," exclaims Dumeril, "les flambeaux de l'amour—des phares—des télegraphes nocturnes—qui brillent et signalent au loin le besoin de la production dans le silence et l'obscurité des nuits" Mr Leonard Knapp, refining upon this notion, conjectures that the peculiar conformation of the head of the male glow-worm is intended as a converging reflector of the light of the female, "always beneath him on the earth." "As we commonly," he adds, "and with advantage, place our hand over the brow, to obstruct the rays of light falling from above, which enables us to see clearer an object on the ground, so must the projecting hood of this creature converge the visual rays to a point beneath."

Unfortunately for this theory, the grubs—which being in a state of infancy, are therefore incapable of propagating—exhibit a no less brilliant light than the perfect insect. Dr. Geer says the light of the grub was paler, but in the one which I had it was not so. He also remarked the same light in the nymph state, which he describes as "very lively and brilliant;" and, in this stage of existence. it is still less capable of propagating than in that of larva. "Of what use, then," he asks, "is the light displayed by the glow-worm? It must serve some purpose yet unknown. The authors who have spoken of the male glow-worms, say positively that they shine in the dark as well as the females." These plain facts appear completely to extinguish the poetical theory.—Journal of the Royal Institution.

peculiar nature. The transmutations they undergo, are also more numerous than those of any insect hitherto mentioned; and, in consequence, they have been placed in the third order of changes by Swammerdam, who has thrown such lights upon this part of natural history. In the second order of changes, mentioned before, we saw the grasshopper and the earwig, when excluded from the egg, assume a form very like that which they were after to preserve; and seemed arrived at a state of perfection, in all respects, except in not having wings; which did not bud forth until they were come to maturity. But the insects of this third order, that we are now about to describe, go through a much greater variety of transformations: for, when they are excluded from the egg, they assume the form of a small caterpillar, which feeds and grows larger every day, often changing its skin, but still preserving its form. When the animal has come to a certain magnitude in this state, it discontinues eating, makes itself a covering or husk, in which it remains wrapped up, seemingly without life or motion; and after having for some time continued in this state, it once more bursts its confinement, and comes forth a beautiful butterfly. Thus we see this animal put on no less than three different appearances, from the time it is first excluded from the egg. It appears a crawling caterpillar; then an insensible aurelia, as it is called, without life or motion; and lastly, a butterfly, variously painted, according to its different kind. Having thus distinguished this class of insects from all others, we will first survey their history in general; and then enter particularly into the manners and nature of a few of them, which most deserve our curiosity and attention.

CHAP. II.

TRANSFORMATION OF THE CATERPILLAR INTO ITS CORRESPONDING BUTTERFLY OR MOTH.

When winter has disrobed the trees of their leaves, nature then seems to have lost her insects. There are thousands of different kinds, with and without wings; which, though swarming at other seasons, then entirely disappear. Our fields are re-peopled, when the leaves begin to bud, by the genial influence of spring; and caterpillars, of various sorts, are seen feeding upon the promise of the year, even before the leaves are completely unfolded. Those caterpillars, which we then see, may serve to give us a view of the general means which nature employs to preserve such a number of insects during that season, when they can no longer find subsistence. It is known, by united experience, that all these animals are hatched from the eggs of butterflies; and those who observe them more closely, will find the fly very careful in depositing its eggs in those places where they are likely to be hatched with the greatest safety and success. During winter, therefore, the greatest number of caterpillars are in an egg state; and in this lifeless situation brave all the rigours and the humidity of the climate: and though often exposed to all its changes, still preserve the latent principles of life, which is more fully exerted at the approach of spring.

In general, however, whether the animal has subsisted in an egg state during the winter; or whether as a butterfly, bred from an aurelia, in the beginning of spring; or a butterfly that has subsisted during the winter, and lays eggs as soon as the leaves of plants are shot forward, the whole swarm of caterpillars are in motion to share the banquet that Nature has provided. There is scarce a plant that has not its own peculiar insects: and some are known to support hard, like shagreen; the skin of the latter is hairy, and, as it were, thorny; and generally, if handled, stings like nettles. Some of them even cause this stinging pain, if but approached too nearly.

Caterpillars, in general, have six small black spots placed on the circumference of the fore ring, and a little to the side of the head. Three of these are larger than the rest, and are convex and transparent: these Réaumur takes to be the eyes of the caterpillar; however, most of these reptiles have very little occasion for sight, and seem only to be directed by their feeling.

But the parts of the caterpillar's body which most justly demand our attention, are the stigmata, as they are called; or those holes on the sides of its body, through which the animal is supposed to breathe. All along this insect's body, on each side, these holes are easily discoverable. They are eighteen in number, nine on a side, rather nearer the belly than the back; a hole for every ring, of which the animal's body is composed, except the second, the third, and the last. These oval openings may be considered as so many mouths, through which the insect breathes; but with this difference, that as we have but one pair of lungs, the caterpillar has no less than eighteen. It requires no great anatomical dexterity to discover these lungs in the larger kind of caterpillars: they appear, at first view, to be hollow cartilaginous tubes, and of the colour of mother-of-pearl. These tubes are often seen to unite with each other; some are perceived to open into the intestines; and some go to different parts of the surface of the body. That these vessels serve to convey the air, appears evidently, from the famous experiment of Malpighi; who, by stopping up the mouths of the stigmata with oil, quickly suffocated the animal, which was seen to die convulsed the instant after. In order to ascertain his theory, he rubbed oil upon other parts of the insect's body, leaving the stigmata free; and this seemed to have no effect upon the animal's health, but it continued to move and eat as usual: he rubbed oil on the stigmata of one side, and the animal underwent a partial convulsion, but recovered soon after.

The life of a caterpillar seems one continued succession of changes; and it is seen to throw off one skin only to assume another; which also is divested in its turn: and thus for eight or ten times successively. We must not, however, confound this changing of the skin with the great metamorphosis which it is afterwards to undergo. The throwing off one skin, and assuming another, seems, in comparison, but a slight operation among these animals; this is but the work of a day; the other is the great adventure of their lives.

In proportion as the time approaches in which the caterpillar is to cast its old skin, its colours become more feeble, the skin seems to wither and grow dry, and in some measure resembles a leaf, when it is no longer supplied with moisture from the stock. At that time, the insect begins to find itself under a necessity of changing; and it is not effected without violent labour, and perhaps pain. A day or two before the critical hour approaches, the insect ceases to eat, loses its usual activity, and seems to rest immovable. It seeks some place to remain in security; and no longer timorous, seems regardless even of the touch. It is now and then seen to bend itself and elevate its back; again it stretches to its utmost extent: it sometimes lifts up the head, and then lets it fall again; it sometimes waves it three or four times from side to side, and then remains in quiet. At length, some of the rings of its body, particularly the first and second, are seen to swell considerably, the old skin distends and bursts, till, by repeated swellings and contractions in every ring, the animal disengages itself, and creeps from its inconvenient covering.

How laborious soever this operation may be, it is performed in the space of a minute; and the animal, having thrown off its old skin, seems to enjoy new vigour, as well as acquired colouring and beauty.

The caterpillar having in this manner continued for several days feeding, and at intervals casting its skin, begins at last to prepare for its change into an aurelia.

Preparatory to this important event, the caterpillar most usually quits the plant, or the tree on which it fed; or at least attaches itself to the stalk or the stem, more gladly than the leaves. It forsakes its food, and prepares, by fasting, to undergo its transmutation. In this period, all the food it has taken is thoroughly digested; and it often voids even the internal membrane which lined its intestines. Some of this tribe, at this period also, are seen entirely to change colour; and the vivacity of the tints in all, seem faded. Those of them which are capable of spinning themselves a web, set about this operation; those which have already spun, await the change in the best manner they are able. The web, or cone, with which some cover themselves, hides the aurelia contained within from the view; but in others, where it is more transparent, the caterpillar, when it has done spinning, strikes into the claws of the two feet under the tail, and afterwards forces in the tail itself, by contracting those claws, and violently striking the feet one against the other. If, however, they be taken from their web at this time, they appear in a state of great langour; and, incapable of walking, remain on that spot where they are placed. In this condition they remain one or two days, preparing to change into an aurelia; somewhat in the manner they made preparations for changing their skin. They then appear with their bodies bent into a bow, which they now and then are seen to straighten: they make no use of their legs; but if they attempt to change place, do it by the contortions of their body. In proportion as their change into an aurelia approaches, their body becomes more and more bent; while their extensions and convulsive contractions become more frequent. The hinder end of the body is the part which the animal first disengages from its caterpillar skin; that part of the skin remains empty, while the body is drawn up contracted towards the head. In the same manner they disengage themselves from the two succeeding rings; so that the animal is then lodged entirely in the fore part of its caterpillar covering: that half which is abandoned, remains flacid and empty; while the fore part, on the contrary, is swollen and distended. The animal, having thus quitted the hinder part of its skin to drive itself up into the fore part, still continues to heave and work as before; so that the skull is soon seen to burst into three pieces, and a longitudinal opening is made in the three first rings of the body, through which the insect thrusts forth its naked body, with strong efforts. Thus, at last, it entirely gets free from its caterpillar skin, and for ever forsakes its most odious reptile form.

The caterpillar, thus stripped of its skin for the last time, is now become an aurelia; in which the parts of the future butterfly are all visible; but in so soft a state, that the smallest touch can discompose them. The animal is now become helpless and motionless; but only waits for the assistance of the air to dry up the moisture on its surface, and supply it with a crust capable of resisting external injuries. Immediately after being stripped of its caterpillar skin, it is of a green colour, especially in those parts which are distended by an extraordinary afflux of animal moisture; but in ten or twelve hours after being thus exposed, its parts harden, the air forms its external covering into a firm crust, and in about four-and-twenty hours, the aurelia may be handled without endangering the little animal that is thus left in so defenceless a situation. Such is the history of the little pod, or cone, that is found so common by every pathway, sticking to nettles, and sometimes shining like polished gold. From the beautiful and resplendent colour, with which it is thus sometimes adorned, some authors have called it a Chrysalis, implying a creature made of gold.

Such are the efforts by which these little animals prepare for a state of perfection; but their care is still greater to provide themselves a secure retreat, during this season of their imbecility. It would seem like erecting themselves a monument, where they were to rest secure, until Nature had called them into a new and more improved existence. For this purpose, some spin themselves a cone, or web, in which they lie secure till they have arrived at maturity: others, that cannot spin so copious a covering, suspend themselves by the tail, in some retreat where they are not likely to meet disturbances. Some mix sand with their gummy and moist webs, and thus make themselves a secure incrustation; while others, before their change, bury themselves in the ground, and thus avoid the numerous dangers that might attend them. Many are the forms which these several of different kinds. Of these, many are hatched from the egg, at the foot of the tree, and climb up to its leaves for subsistence: the eggs of others have been glued by the parent butterfly to the leaves; and they are no sooner excluded from the shell, but they find themselves in the midst of plenty.

When the caterpillar first bursts from the egg, it is small and feeble; its appetites are in proportion to its size, and it seems to make no great consumption: but as it increases in magnitude, it improves in its appetites; so that, in its adult caterpillar state, it is the most ravenous of all animals whatsoever. A single caterpillar will eat double its own weight of leaves in a day, and yet seems no way disordered by the meal.—What would mankind do, if their oxen or their horses were so voracious! *

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* Ravages of Caterpillars.—The sudden appearance of great numbers of these caterpillars in particular years, and their scarcity in others, is in some degree explained by a fact stated by Mr. Salisbury. "A gentleman of Chelsea," he says, "has informed me that he once took a nest of moths and bred them; that some of the eggs came the first year, some the second, and others of the same nest did not hatch till the third season." We reared, during 1829, several nests both of the brown-tails and of the golden-tails, and a number of the females deposited their eggs in our nurse-cages; but, contrary to the experiment just quoted, all of these were hatched during the same autumn. The difference of temperature and moisture in particular seasons may produce this diversity.

An alarm, similar to those we have recorded, was produced in France in 1735, by the green striped caterpillars of a moth very common in Britain, called by collectors, from a mark on its upper wings, the Y, or more properly, the γ moth (*Plusia Gamma*, Ochs.) Though ranked in some classifications amongst the nocturnal moths, it flies chiefly by day, and may be seen in Battersea-fields, or other moist meadows, flitting from herb to herb and flower to flower, in short and low flights; for it seldom soars higher than the tallest grass-stem, or the crimson flower-heads of the knap-weed, upon whose honey it sometimes regales, remaining on the wing all the while it is sipping it. During the cold, rainy summer of 1829, it was almost the only moth which appeared plentiful. At least two broods seem to be produced during the season; which may account for its being found from May till the setting-in of the winter frosts.

Notwithstanding it being so plentiful, however, we have not heard of its having ever been so destructive here as in France, where, as usual, the most improbable causes were assigned for its increase. "In some places," says Réaumur, "they assured me they had seen an old soldier throw the spell; and in other places an ugly and mischievous old woman had wrought all the evil." These supposed supernatural agents, however, must have been either very numerous or very active to fill, not only the gardens, but every field, with legions of those caterpillars, which devoured almost every green thing, and left only the stalks as monuments of their devastation. The alarm proceeded farther, for it began to be whispered that they were poisonous; and many were in consequence afraid to touch soups or salads. Réaumur thought it incumbent on him to refute this notion at some length; but we cannot accept his doctrine as very palatable, when he tells us that few dishes of soup or salad are *ever* prepared without containing caterpillars, and yet all the world are not poisoned thereby, any more than by eating oysters or viper broth. He endeavoured also to account by calculation for their excess, from the data of the female moth laying about four hundred eggs. Now, if there were only twenty caterpillars distributed in a garden, and all lived through the winter, and became moths in the succeeding May, the eggs laid by these, if all fertile, would produce 800,000, a number much more than sufficient to effect great destruction. Did not Providence, therefore, put causes in operation to keep them in due bounds, the caterpillars of this moth alone, leaving out of consideration the 2,000 other British species, would soon destroy more than half of our vegetation.—Insect Trans.

The Parliament of Paris.—It is not, therefore, very much to be wondered at, that the ignorant, who are so prone to become the victim of groundless fears, should have taken serious alarm on having so unusual a phenomenon forced upon their attention. Some alarmists accordingly asserted that the caterpillars "were the usual presage of the plague;" and others, that they not only presaged it, but would actually cause it, "for their numbers were great enough to render the air pestilential," while, to add to the mischief, "they would destroy every kind of vegetation, and starve the cattle in the fields." "Almost every one," adds Curtis, "ignorant of their history, was under the greatest apprehensions concerning them; so that even prayers were offered up in some churches to deliver the country from the apprehended approaching calamity."

It seems to have been either the same caterpillar, or one very nearly allied to it, These voracious habits, with its slow, crawling motion, but still more stinging like that of nettles, which follows upon handling the greatest number o them, make these insects not the most agreeable objects of human curiosity However, there are many philosophers who have spent years in their contemplation; and who have not only attended to their habits and labours, but minutely examined their structure and internal conformation.

The body of the caterpillar, when anatomically considered, is found composed of rings, whose circumference is pretty near circular or oval. They are generally twelve in number, and are all membranaceous; by which caterpillars may be distinguished from many other insects, that nearly resemble them in form. The head of the caterpillar is connected to the first ring by the neck; that is generally so short and contracted, that it is scarce visible. All the covering of the head in caterpillars seems to consist of a shell; and they have neither upper nor under jaw, for they are both placed rather vertically, and each jaw armed with a large thick tooth, which is singly equal to number. With these the animals devour their food in such amazing quantities; and with these, some of the kind defend themselves against their enemies. Though the mouth be kept shut, the teeth are always uncovered; and while the insect is in health, they are seldom without employment. Whatever the caterpillar devours, these teeth serve to chop it into small pieces, and render the parts of the leaf fit for swallowing. Many kinds, while they are yet young, eat only the succulent part of the leaf, and leave all the fibres untouched; others, however, attack the whole leaf, and eat it clean away. One may be amused, for a little time, in observing the avidity with which they are seen to feed; some are seen eating the whole day; others have their hours of repast; some choose the night, and others the day. When the caterpillar attacks a leaf, it places its body in such a manner that the edge of the leaf shall fall between its feet, which keeps it steady, while the teeth are employed in cutting it: these fall upon the leaf, somewhat in the manner of a pair of gardener's sheers; and every morsel is swallowed as soon as cut. Some caterpillars feed upon leaves so very narrow, that they are not broader than their mouths; in this case the animal is seen to devour it from the point, as we would eat a radish.

As there are various kinds of caterpillars, the number of their feet are various; some having eight, and some sixteen. Of these feet the six foremost are covered with a sort of shining gristle; and are, therefore, called the shelly legs. The hindmost feet, whatever be their number, are soft and flexible, and are called membranaceous. Caterpillars, also, with regard to their external figure, are either smooth, or hairy. The skin of the first kind is soft to the touch, or

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probably that of the golden-tail (*Porthesia Chrysorrhœa*), which in 1731-2, produced a similar alarm in France. Réaumur, on going from Paris to Tours, in September, 1730, found every oak, great and small, literally swarming with them, and their leaves parched and brown as if some burning wind had passed over them; for when newly hatched, like the young buff-tips, they only eat one of the membranes of the leaf, and of course the other withers away. These infant legions, under the shelter of their warm nests, survived the winter in such numbers, that they threatened the destruction not only of the fruit-trees, but of the forests,—every tree, as Réaumur says, being over-run with them. The Parliament of Paris thought that ravages so widely extended loudly called for their interference, and they accordingly issued an edict, to compel the people to uncaterpillar (*décheniller*) the trees; which Réaumur ridiculed as impracticable, at least in the forests. About the middle of May, however, a succession of cold rains produced so much mortality among the caterpillars, that the people were happily released from the edict; for it soon became difficult to find a single individual of the species. In the same way the cold rains, during the summer of 1829, seem to have nearly annihilated the lackeys, which in the early part of the summer, swarmed on every hedge around London. The ignorance displayed in France at the time in question, was not inferior to that recorded by Curtis; for the French journalists gravely asserted that part of the caterpillars were produced by spiders; and that these spiders, and not the caterpillars, constructed the webs of the slime of snails, which they were said to have been seen collecting for the purpose! "Verily," exclaims Réaumur, "there is more ignorance in our age than one might believe."—INSECT TRANSFORMAanimals assume in this helpless state; and it often happens, that the most deformed butterflies issue from the most beautiful aurelias.

In general, however, the aurelia takes the rude outline of the parts of the animal which is contained within it; but as to the various colours which it is seen to assume, they are rather the effect of accident; for the same species of insect does not at all times assume the same hue when it becomes an aurelia. In some, the beautiful gold colour is at one time found; in others, it is wanting. This brilliant hue, which does not fall short of the best gilding, is formed in the same manner in which we see leather obtain a gold colour, though none of that metal ever enters into the tincture. It is only formed by a beautiful brown varnish, laid upon a white ground; and the white thus gleaming through the transparency of the brown, gives a charming golden yellow. These two colours are found, one over the other, in the aurelia of the little animal we are describing; and the whole appears gilded, without any real gilding.

The aurelia thus formed, and left to time to expand into a butterfly, in some measure resembles an animal in an egg, that is to wait for external warmth to hatch it into life and vigour.

The aurelia, though it bears a different external appearance, nevertheless contains within it all the parts of the butterfly in perfect formation; and lying each in a very orderly manner, though in the smallest compass. These, however, are so fast and tender, that it is impossible to visit without discomposing them. When either by warmth, or increasing vigour, the parts have acquired the necessary force and solidity, the butterfly then seeks to disembarrass itself of those bands which kept it so long in confinement. Some insects continue under the form of an aurelia not above ten days; some twenty; some several months; and even for a year together.*

The butterfly, however, does not continue so long under the form of an aurelia, as one would be apt to imagine. In general, those caterpillars that provide themselves with cones, continue within them but a few days after the cone is completely finished. Some, however, remain buried in this artificial covering for eight or nine months, without taking the smallest sustenance during the whole time: and though in the caterpillar state no animals were so voracious, when thus transformed, they appear a miracle of abstinence. In all, sooner or later, the butterfly bursts from its prison; not only that natural prison which is formed by the skin of the aurelia, but also from that artificial one of silk, or any other substance in which it has inclosed itself.

The efforts which the butterfly makes to get free from its aurelia state, are by no means so violent as those which the insect had in changing from the caterpillar into the aurelia. The quantity of moisture surrounding the butterfly is by no means so great as that attending its former change; and the shell of the aurelia is so dry, that it may be cracked between the fingers.

If the animal be shut up within a cone, the butterfly always gets rid of the natural internal skin of the aurelia, before it eats its way through the external covering which its own industry had formed round it. In order to observe the manner in which it thus gets rid of the aurelia covering, we must cut open the cone, and then we shall have an opportunity of discovering the insect's efforts to emancipate itself from its natural shell. When this operation begins, there seems to be a violent agitation in the humours contained within the little animal's body. Its fluids seem driven, by a hasty fermentation, through all the vessels; while it labours violently with its legs, and makes several other violent struggles to get free. As all these motions concur with the growth of the insect's wings and body, it is impossible that the brittle skin which covers it should longer resist: it at length gives way, by bursting in four distinct and regular pieces. The skin of the head and legs first separates; then the skin at the back flies open, and dividing into two regular portions, disengages the back and wings: then there likewise happens another rupture in that portion which covered the rings of the back of the aurelia. After this, the butterfly, as if fatigued with its struggles, remains very quiet for some time, with its wings pointed downwards, and its legs fixed in the skin which it had just thrown off. At first sight the animal, just set free, and permitted the future use of its wings, seems to want them entirely: they take up such little room, that one would wonder where they were hidden. But soon after, they expand so rapidly, that the eye can scarce attend their unfolding. From reaching scarce half the length of the body, they acquire, in a most wonderful manner, their full extent and bigness, so as to be each five times larger than they were before. Nor is it the wings alone that are thus increased: all their spots and paintings, before so minute as to be scarce discernible, are proportionably extended; so that, what a few minutes before seemed only a number of confused, unmeaning points, now become distinct and most beautiful ornaments. Nor are the wings, when they are thus expanded, unfolded in the manner in which earwigs and grasshoppers display theirs, who unfurl them like a lady's fan: on the contrary, those of butterflies actually grow to their natural size in this very short space. The wing, at the instant it is freed from its late confinement, is considerably thicker than afterwards; so that it spreads in all its dimensions, growing thinner as it becomes broader. If one of the wings be plucked from the animal just set free, it may be spread by the fingers, and it will soon become as broad as the other, which has been left behind. As the wings extend themselves so suddenly, they have not yet had time to dry; and accordingly appear like pieces of wet paper, soft, and full of wrinkles. In about half an hour they are perfectly dry, their wrinkles entirely disappear, and the little animal assumes all its splendour. The transmutation being thus perfectly finished, the butterfly discharges three or four drops of a blood-coloured liquid, which are the last remains of its superfluous moisture.* Those aurelias which are inclosed within a cone, find their exit more difficult, as they have still another prison to break through: this, however, they perform in a short time; for the butterfly, freed from its aurelia skin, butts with its head violently against the walls of its artificial prison; and

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* FACT IN ENTOMOLOGY.—"I have lately observed a curious fact, which I have never seen noticed in any book which has fallen in my way; viz., that it is the tail of the caterpillar which becomes the head of the butterfly. I found it hard to believe till I had convinced myself of it in a number of instances. The caterpillar weaves its web from its mouth, finishes with the head downwards, and the head, with the six front legs, are thrown off from the chrysalis, and may be found dried up, but quite distinguishable, at the bottom of the web. The butterfly comes out at the top. Is this fact generally known?" —CORRESPONDENT OF THE MAGAZINE OF NATURAL HISTORY.

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* **Showers of Blood Explained.** — It is not a little remarkable, that when insects are evolved from the pupa state, they always discharge some substance. It is important to remark, that the matter voided at this period by many butterflies (*Vanessæ*, &c.) is of a red colour, resembling blood, while that of several moths is orange or whitish. It could not readily be supposed that this should become the object of superstitious terror, yet so it has been in more instances than one. Mouffet tells us, from Sleidan, that in the year 1553, a prodigious multitude of butterflies swarmed throughout a great portion of Germany, and sprinkled plants, leaves, buildings, clothes, and men, with bloody drops, as if it had rained blood. Several historians, indeed, have recorded showers of blood among the prodigies which have struck nations with consternation, as the supposed omen of the destruction of cities and the overthrow of empires. About the beginning of July, 1608, one of these showers of blood was supposed to have fallen in the suburbs of Aix, and for many miles around it, and particularly the walls of a churchyard were spotted with the blood. This occurrence would, no doubt, have been chronicled in history as a supernatural prodigy, had not Aix possessed at this time, in M. Peiresc, a philosopher, who, in the eager pursuit of all kinds of knowledge, had not neglected the study of insects. It is accordingly related, in the curious life of Peiresc, by Gassendi, that he had, about the time of the rumoured shower of blood, happened to find a large chrysalis, the beauty of which made him preserve it in a box. Some time after, hearing a noise in the box, he opened it, and found a fine butterfly, which had left upon the bottom a red stain of considerable magnitude, and apparently of exactly the same nature with the drops on the stones, popularly supposed to be blood. He remarked, at the same time, that there were countless numbers of butterflies flying about, which confirmed him in the belief of his having discovered the true cause; and this was further corroborated by his finding none of the red drops in the heart of the city, where the butterflies were rarely seen. He also remarked, that the drops were never on tiles, and seldom on the upper part of a stone, as they must have been had they fallen from the heavens, but usually appeared in cavities and parts protected by some angular projection. What Peiresc had thus ascertained, he lost

no time in disclosing to many persons of knowledge and curiosity, who had been puzzling themselves to account for the circumstance by far-fetched reasonings, such as a supposed vapour which had carried up a supposed red earth into the air that had tinged the rain;—no less wide of the truth than the popular superstition which ascribed it to magic, or to the devil himself. Those who are curious to verify the discovery, as we may well call it, of Peiresc, may easily do so by rearing any of the spinous caterpillars which feed on the nettle till they are transformed into the butterfly. We have witnessed the circumstance in innumerable instances.

It is a curious and interesting probability, that the crimson snow of the Alpine and Arctic regions, which has recently excited so much scientific inquiry, should be referable to a somewhat similar cause,—a circumstance which will apologize for our taking some notice of it here by way of illustration. According to Professor Agardh, red snow is very common in all the alpine districts of Europe, and is probably of the same nature with that brought from the polar regions by Captain Ross. Saussure saw it in abundance on Mont Brevern, in Switzerland, and elsewhere; Ramond found it on the Pyrenees; and Sommerfeldt in Norway. In March, 1808, the whole country about Cadone, Belluno, and Feltri, is reported to have been covered in a single night with rose-coloured snow; and at the same time a similar shower was witnessed on the mountains of Valtelin, Brescia, Carinthia, and Tyrol. But the most remarkable red snow shower was that which fell on the night between the 14th and 15th of March, 1823, in Calabria, in Abruzzo, in Tuscany, at Bologna, and through the whole chain of the Apennines.

Upon the return of Captain Ross from the Polar expedition some years ago, the specimens of red snow which he brought home were examined by three of our most distinguished observers, Wollaston, Bauer, and Robert Brown, who all came to the conclusion that it was of a vegetable nature, but differed as to its botanical characteristics. Dr. Wollaston supposed it to be the seed of some moss; Mr. Brown was inclined to consider it an algæ, related to *Tremella cruenta*, a common native plant; while Mr. Bauer thought it was a fungus of the genus *Uredo*. Professor Agardh refers it with Brown to the lowest order of algæ, but standing as a distinct genus upon the very limits of the animal and vegetable kingdoms. Saussure, indeed, from finding that the red snow of the Alps gave out, when burnt, a smell like that of plants, concluded that it was of vegetable origin, and supposed it to consist of the farina of some plant, though he could not trace it to its source. Baron Wrangel, again, who discovered a production similar or identical with Agardh's *Protococcus nivalis* growing upon limestone rocks, mentions that it was easily detached when placed under water, and in three days it was converted into animated globules like infusory animalcules, which swam about and were made prey of by other infusoria. Professor Nees von Esenbeck, of Bonn, is inclined to think that the minute red globules, of which the *Protococcus* consists, are the vegetable state of bodies which had gone through a previous animal existence.

The Rev. W. Scoresby, on the other hand, conjectures that the red colour of the snow may be traced to the same cause as the orange-coloured ice of the polar seas, which arises from innumerable minute animals belonging to the *Radiata*, and similar to the *Beroe globulosa* of Lamarck. It is about the size of a pin's head, transparent, and marked with twelve brownish patches of dots. In olive-green sea water, he estimated 110,592 of these in a cubic foot.

Agardh remarks, that it is agreed upon all hands that the crimson snow always falls in the night, from which he infers that it has not been actually seen to fall. He thinks it is called into existence by the vivifying power of the sun's light, after its warmth has caused the snow to dissolve, accompanied by the incomprehensible power in white snow of producing a colour.

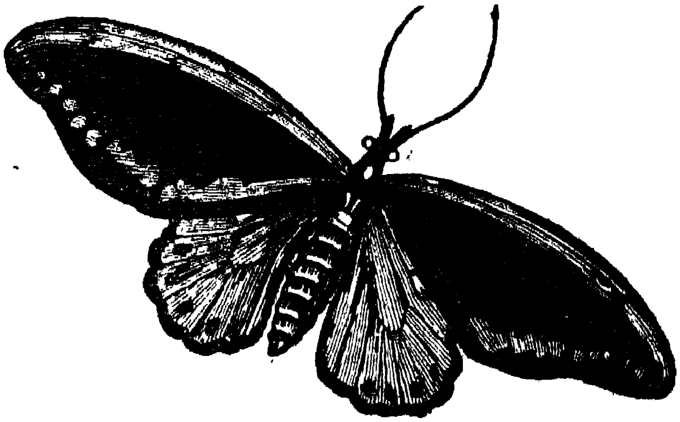
Réaumur says, with much justice, on another occasion, that an ordinary spectator frequently discovers what has escaped the notice of the best observers, and so it should seem it has happened in the present case,—the learned naturalists just mentioned having gone as wide of the facts, as the philosophers at Aix in accounting for the supposed shower of blood. Mr. Thomas Nicholson, accompanied with two other gentlemen, made an excursion on the 24th of July, 1821, to Sowallick Point, near Bushman's Island, in Prince Regent's Bay, in quest of meteoric iron. "The summit of the hill," he says, "forming the point, is covered with huge masses of granite, whilst the side which forms a gentle declivity towards the bay was covered with crimson snow. It was evident, at first view, that this colour was imparted to the snow by a substance lying on the surface. This substance lay scattered here and there in small masses, bearing some resemblance to powdered cochineal, surrounded by a lighter probably with its eyes, that are rough and like a file, it rubs the internal surface away; till it is at last seen bursting its way into open light; and, in less than a quarter of an hour, the animal acquires its full perfection.

Thus, to use the words of Swammerdam, we see a little, insignificant creature distinguished, in its last birth, with qualifications and ornaments, which man, during his stay upon earth, can never even hope to acquire. The butterfly, to enjoy life, needs no other food but the dews of Heaven; and the honeyed juices which are distilled from every flower. The pageantry of princes cannot equal the ornaments with which it is invested; nor the rich colouring that embellishes its wings. The skies are the butterfly's proper habitation, and the air its element: whilst man comes into the world naked, and often roves about without habitation or shelter; exposed, on one hand, to the heat of the sun; and, on the other, to the damps and exhalations of the earth; both alike enemies of his happiness and existence.—A strong proof that, while this little animal is raised to its greatest height, we are as yet, in this world, only candidates for perfection!

CHAP. III.

BUTTERFLIES AND MOTHS.

It has been already shown that all Butterflies are bred from caterpillars; and we have exhibited the various circumstances of that surprising change. It has been remarked, that butterflies may be easily distinguished from flies of every other kind, by their wings; for, in others, they are either transparent, like gauze, as we see in the common flesh fly; or they are hard and crusted, as we see in the wings of the beetle. But in the butterfly, the wings are soft, opake, and painted over with a beautiful dust, that comes off with handling.



(The Trojan Butterfly.)

shade, which was produced by the colouring matter being partly dissolved and diffused by the deliquescent snow. During this examination, our hats and upper garments were observed to be daubed with a substance of a similar red colour, and a moment's reflection convinced us that this was the excrement of the little auk (*Uria alle*, Temminck), myriads of which were continually flying over our heads, having their nests among the loose masses of granite. A ready explanation of the origin of the red snow was now presented to us, and not a doubt remained in the mind of any that this was the correct one. The snow on the mountains of higher elevation than the nests of these birds was perfectly white, and a ravine at a short distance, which was filled with snow from top to bottom, but which afforded no hiding-place for these birds to form their nests, presented an appearance uniformly white."

This testimony seems to be as clear and indisputable as the explanation given by Peiresc of the ejecta of the butterflies at Aix.

The number of these beautiful animals is very great; and though Linnæus has reckoned up above seven hundred and sixty different kinds, the catalogue is still very incomplete. Every collector of butterflies can show undescribed species: and such as are fond of minute discovery, can here produce animals that have been examined only by himself. In general, however, those of the warm climates are larger and more beautiful than such as are bred at home; and we can easily admit the beauty of the butterfly, since we are thus freed from the damage of the caterpillar. It has been the amusement of some to collect these animals from different parts of the world; or to breed them from caterpillars at home. These they arrange in systematic order, or dispose so as to make striking and agreeable pictures: and all must grant, that this specious idleness is far preferable to that unhappy state which is produced by a total want of employment.

The wings of butterflies, as was observed, fully distinguish them from flies of every other kind.* They are four in number; and though two of them be cut off, the animal can fly with the two others remaining. They are, in their own substance, transparent; but owe their opacity to the beautiful dust with which they are covered; and which has been likened, by some naturalists, to the feathers of birds; by others, to the scales of fishes; as their imaginations were disposed to catch the resemblance. In fact, if we regard the wing of a butterfly with a good microscope, we shall perceive it studded over with a variety of little grains of different dimensions and forms, generally supported upon a footstalk, regularly laid upon the whole surface. Nothing can exceed the beautiful and regular arrangement of these little substances; which thus serve to paint the butterfly's wing, like the tiles of a house. Those of one rank are a

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But though it will account, perhaps, for the red snow of the polar regions, it will not explain that of the Alps, the Apennines, and the Pyrenees, which are not, so far as we know, visited by the little auk. Thus the matter at present rests, till it be elucidated by further observations.—INSECT TRANSFORMATIONS.

* THE WINGS OF BUTTERFLIES.—Every wing consists of two membranes, more or less transparent, applied to each other: the upper one being very strongly attached to the nervures or veins, and the lower adhering more loosely, so as to be separable from them. The nervures are a kind of hollow tube, which originate in the trunk, and diminish gradually, the marginal ones excepted, to their termination; and appear to contain air-vessels. The expansion of the wing is supposed to arise from a subtle fluid being introduced into these vessels, and thus an impulse is given to every part of this remarkable organ, so that it is supported in its flight like a sail by its cordage. It is aided also by other means which we have not space particularly to describe.

The wings of butterflies, sphinges, and moths, are covered with scales, so very minute as to be taken for extremely fine dust, placed in the most perfect order, and having a great diversity of beautiful colours. They have been well compared to Mosaic work, produced by small pieces of variously-coloured glass, stuck in a kind of paste, yet so minute as hardly to be perceived; looking rather like a picture whose parts are harmoniously combined. But here art is infinitely surpassed. A piece of the wing of a peacock butterfly, a quarter of an inch square, was placed under a microscope, when seventy rows, each containing ninety scales, were counted; there were, therefore, six thousand three hundred scales on one side of this small portion of wing, and a square inch must have the amazing number of one hundred thousand seven hundred and thirty-six scales. The number of glass pins in a square inch of fine mosaic is only eight hundred and seventy, so that it is one hundred and fifteen times coarser than the wing of this butterfly, which is of middle size, and the scales of which are proportional: what, then, must be the comparison with some of the smaller tribes, whose whole dimensions are a quarter of an inch!

The wing of a peacock butterfly prematurely taken out of a chrysalis, proved to be nine and a quarter times finer than that of the perfect insect; so that it was ten thousand and sixty-three times finer than the most boasted mosaic

The most superb of all the butterflies is the imperial Trojan. It is a native of Amboyna, of an exceedingly rich green colour, having a fine golden tinge diffused through it, and "it may be doubted," says Linnæus, "whether nature has produced any object more beautiful amongst insects." It measures upwards of seven inches and a half from the tip of one wing to that of the other.

Many insects can fly in all directions without turning.

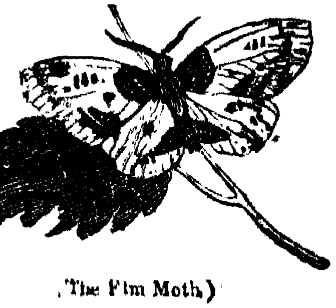
little covered by those that follow: they are of many figures: on one part of the wing may be seen a succession of oval studs; on another part, a cluster of studs, each in the form of a heart: in one place they resemble a hand open, and in another they are long or triangular; while all are interspersed with taller studs, that grow between the rest, like mushrooms upon a stalk. The wing itself is composed of several thick nerves, which render the construction very strong, though light; and though it be covered over with thousands of these scales or studs, yet its weight is very little increased by the number. The animal is with ease enabled to support itself a long while in air, although its flight be not very graceful. When it designs to fly to a considerable distance, it ascends and descends alternately; going sometimes to the right, sometimes to the left, without any apparent reason. Upon closer examination, however, it will be found that it flies thus irregularly in pursuit of its mate; and as dogs bait and quarter the ground in pursuit of their game, so these insects traverse the air in quest of their mates, whom they can discover at more than a mile's distance.

If we prosecute our description of the butterfly, the animal may be divided into three parts; the head, the corslet, and the body.

But leaving the other parts of the butterfly, let us turn our attention particularly to the head. The eyes of butterflies have not all the same form; for, in some they are large, in others small; in some they are the larger portion of a sphere, in others they are but a small part of it, and just appearing from the head. In all of them, however, the outward coat has a lustre, in which may be discovered the various colours of the rainbow. When examined a little closely, it will be found to have the appearance of a multiplying glass; having a great number of sides, or facets, in the manner of a brilliant cut diamond. In this particular, the eye of the butterfly, and of most other insects, entirely correspond; and Leuwenhoek pretends, there are above six thousand facets on the cornea of a flea. These animals, therefore, see not only with great clearness, but view every object multiplied in a surprising manner. Puget adapted the cornea of a fly in such a position, as to see objects through it by the means of a microscope; and nothing could exceed the strangeness of its representations: a soldier, who was seen through it, appeared like an army of pigmies; for while it multiplied, it also diminished the object: the arch of a bridge exhibited a spectacle more magnificent than human skill could perform; the flame of a candle seemed a beautiful illumination. It still, however, remains a doubt, whether the insect sees objects singly, as with one eye; or whether every facet is itself a complete eye, exhibiting its own object distinct from all the rest.

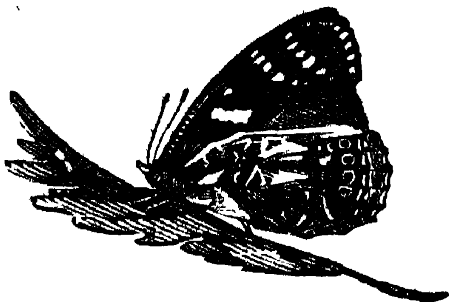
Butterflies, as well as most other flying insects, have two instruments, like horns, on their heads, which are commonly called feelers. They differ from the horns of greater animals, in being movable at their base, and in having a great number of joints, by which means the insect is enabled to turn them in every direction. Those of butterflies are placed at the top of the head, pretty near the external edge of each eye. What the use of these instruments may be, which are thus formed with so much art, and by a workman who does nothing without reason, is as yet unknown to man. They may serve to guard the eye; they may be of use to clean it; or they may be the organ of some sense which we are ignorant of; but this is only explaining one difficulty by another.

We are not so ignorant of the uses of the trunk, which few insects of the butterfly kind are without. This instrument is placed exactly between the eyes; and when the animal is not employed in seeking its nourishment, it is rolled up, like a curl. A butterfly, when it is feeding, flies round some flower, and settles upon it. The trunk is then uncurled, and thrust out either wholly or in part, and is employed in searching the flower to its very bottom, let it be ever so deep. This search being repeated seven or eight times, the butter-



(The Elm Moth)

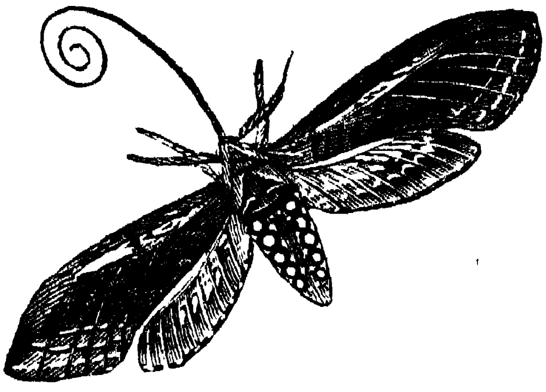
ly then passes to another, and continues to hover over those agreeable to its taste, like a bird over its prey. This trunk consists of two equal, hollow tubes, nicely joined to each other, like the pipes of an organ.



Such is the figure and conformation of these beautiful insects, that cheer our walks, and give us the earliest intimations of summer. But it is not by day alone that they are seen fluttering wantonly from flower to flower, as the greatest number of them fly by night, and expand the most beautiful colouring at those hours when there is no spectator. This tribe of insects has, therefore, been divided into diurnal and nocturnal flies, or, more properly speaking, into butterflies and moths; the one only flying by day, the other most usually on the wing in the night. They may be easily distinguished from each other, by their horns or feelers; those of the butterfly being clubbed, or knobbed at the end; those of the moth, tapering finer and finer to a point. To express it technically—the feelers of butterflies are clavated, those of moths are filiform.

The butterflies, as well as the moths, employ the short life assigned them in a variety of enjoyments. Their whole time is spent either in quest of food, which every flower offers, or in pursuit of the female, whose approach they can often perceive at above two miles' distance. Their sagacity in this particular is not less astonishing than true; but by what sense they are thus capable of distinguishing each other at such distances, is not easy to conceive. It cannot be by the sight, since such small objects as they are must be utterly imperceptible, at half the distance at which they perceive each other; it can scarcely be by the sense of smelling, since the animal has no organs for that purpose. Whatever be their powers of perception, certain it is, that the male, after having fluttered, as if carelessly, about for some time, is seen to take wing, and go forward, sometimes for two miles together, in a direct line to where the female is perched on a flower.

The general rule among insects is, that the female is larger than the male, and this obtains particularly in the tribe I am describing. The body of the male is smaller and more slender; that of the female, thicker, and oval. Previous to the junction of these animals, they are seen sporting in the air, pursuing and flying from each other, and preparing, by a mock combat, for the more important business of their lives.* If they be disturbed while united, the female flies off with the male on her back, who seems entirely passive upon the occasion.



(The Sphinx Carolena.)

But the females of many moths and butterflies seem to have assumed their airy form for no other reason but to fecundate their eggs, and lay them. They are not seen fluttering about in quest of food, or a mate; all that passes, during their short lives, is a junction with the male of about half an hour, after which they deposit their eggs, and die, without taking any nourishment, or seeking any. It may be observed, however, that in all the females of this tribe, they are impregnated by the male by one aperture, and lay their eggs by another.

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* Motions of Insects.—The sporting of butterflies in pairs, trios, or more, has been looked upon by some as pugnacious skirmishing. "A few of our lepidopterous creatures," says Mr. Knapp, "especially the common white butterflies of our gardens, are contentious animals, and drive away a rival from their haunts. We see them progressively ascending into the air, in ardent unheeding contest; and thus they are observed, captured,

All the eggs of butterflies are attached to the leaves of the favourite plant, by a sort of size or glue; where they continue, unobserved, unless carefully sought after. The eggs are sometimes placed round the tender shoots of plants, in the form of bracelets, consisting of above two hundred in each, and generally surrounding the shoot, like a ring upon a finger. Some butterflies secure their eggs from the injuries of air, by covering them with hair, plucked from their own bodies, as birds sometimes are seen to make their nests; so that their eggs are thus kept warm, and also entirely concealed.

All the tribe of female moths lay their eggs a short time after they leave the aurelia; but there are many butterflies that flutter about the whole summer, and do not think of laying till the winter begins to warn them of their approaching end; some even continue the whole winter in the hollows of trees, and do not provide for posterity until the beginning of April, when they leave their retreats, deposit their eggs, and die. Their eggs soon begin to feel the genial influence of the season; the little animals burst from them in their caterpillar state, to become aurelias, and butterflies in their turn, and thus to continue the round of nature.*

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and consumed in a moment by some watchful bird; but we have few more jealous and pugnacious than the little, elegant, blue argus butterfly (*polyommatus alexis*, Stephens), noted and admired by all. When fully animated it will not suffer any of its tribe to cross its path, or approach the flower on which it sits, with impunity; even the large, admirable *vanessa atalanta*, at these times, it will assail and drive away. There is another small butterfly, the copper (*lycæna phlæas*, Fabr.), however, as handsome, and, perhaps, still more quarrelsome, frequenting too the same station and flowers; and a constant warfare exists between them. We shall see these diminutive creatures, whenever they come near each other, dart into action, and continue buffeting one another about till one retires from the contest; when the victor returns in triumph to the station he had left. Should the enemy again advance, the combat is renewed; but should a cloud obscure the sun, or a breeze chill the air, their ardour becomes abated and contention ceases. The copper butterfly enjoys a combat even with its kindred. Two of them are seldom disturbed, when basking on a knot of asters in September, without mutual strife ensuing. Being less affected by cold and moisture than the argus, they remain with us longer, and these contentions are protracted till late in the autumn. The pugnacious disposition of the argus butterfly soon deprives it of much of its beauty; and, unless captured soon after its birth, we find the margins of its wings torn and jagged, the elegant blue plumage rubbed from the wings, and the creature become dark and shabby."—JOURN. OF A NATURALIST.

We are of opinion, on the other hand, that these butterfly skirmishings are not prompted by testiness nor jealousy, but by the spirit of gaiety and frolic—the buoyant feelings arising from the air expanded in their wings and bodies by the warm sunshine, causing the living principle to increase even to exuberance. Were these, indeed, actual combats among the males, like those which take place among game cocks or ruffs (*tringa pugnax*, Linn.), nature would probably have furnished them with weapons suited to such warfare. But butterflies have neither spurs, claws, nor sharp bills, wherewith to assail an enemy; and though they might flap one another with their wings, till their tiny feathers flew about like a snow-shower, yet we never have observed them do so, as Mr. Knapp's description seems to imply. On the contrary, they appear actually to take care that such an accident should not occur while they frisk about one another, rising, falling, and performing zigzag pirouettes in the air, as we see kittens or puppies do on the ground, in their more clumsy but no less frolicsome gambols. Did these skirmishes, besides, originate in rivalry or jealousy, we should always see the butterflies combating in couples, for we never see two or three game cocks set upon an individual; but it is by no means uncommon to see three, and we have observed as many as five, butterflies, all equally engaged in these supposed battles, and each bouncing and popping indiscriminately at the others without ever coming to blows. It seldom happens that they actually touch one another, however long they may be at play,—a circumstance which of itself is sufficient to prove our position.—INSECT TRANS.

* DESTRUCTIVE MOTH.—This moth is

CHAP. IV.

THE ENEMIES OF THE CATERPILLAR.

NATURE, though it has rendered some animals surprisingly fruitful, yet ever takes care to prevent their too great increase. One set of creatures is generally opposed to another; and those are chiefly the most prolific, that are, from their imbecility, incapable of making any effectual defence. The caterpillar has, perhaps, of all other animals, the greatest number of enemies, and seems only to exist by its surprising fecundity. Some animals devour them by hundreds; others, more minute, yet more dangerous, mangle them in various ways: so that, how great soever their numbers may be, their destroyers are in equal proportion. Indeed, if we consider the mischiefs these reptiles are capable of occasioning, and the various damages we sustain from their insatiable rapacity, it is happy for the other ranks of nature, that there are thousands of fishes, birds, and even insects, that live chiefly upon caterpillars, and make them their most favourite repast.

When we described the little birds that live in our gardens, and near our houses, as destructive neighbours, sufficient attention was not paid to the services which they are frequently found to render us. It has been proved, that a single sparrow and its mate, that have young ones, destroy above three thousand caterpillars in a week; not to mention several butterflies, in which numberless caterpillars are destroyed in embryo. It is in pursuit of these reptiles that we are favoured with the visits of many of our most beautiful songsters, that amuse us during their continuance, and leave us when the caterpillars disappear.

The maxim which has often been urged against man, that he, of all other animals, is the only creature that is an enemy to his own kind, and that the human species only are found to destroy each other, has been adopted by persons who never considered the history of insects. Some of the caterpillar kind in particular, that seem fitted only to live upon leaves and plants, will, however, eat each other; and the strongest will devour the weak, in preference to their vegetable food. That which lives upon the oak, is found to seize any of its companions, which it conveniently can, by the first rings, and inflict a deadly wound; it then feasts in tranquillity on its prey, and leaves nothing of the animal but the husk.

But it is not from each other they have most to fear, as in general they are inoffensive, and many of this tribe are found to live in a kind of society. Many kind of flies lay their eggs either upon, or within their bodies; and as these turn into worms, the caterpillar is seen to nourish a set of intestine enemies within its body, that must shortly be its destruction; nature having taught flies, as well as all other animals, the surest methods of perpetuating their kind. "Towards the end of August," says Reaumur, "I perceived a little fly, of a beautiful gold colour, busily employed in the body of a large caterpillar, of that kind which feeds upon cabbage. I gently separated that part of the leaf on which these insects were placed from the rest of the plant, and placed it where I might observe them more at my ease. The fly, wholly taken up by the business in which it was employed, walked along the caterpillar's body, now and then remaining fixed to a particular spot. Upon this occasion, I perceived it every now and then dart a sting, which it carried at the end of its tail, into the caterpillar's body, and then drew it out again, to repeat the same operation in another place. It was not difficult for me to conjecture the business which engaged this animal so earnestly; its whole aim was to deposit its eggs in the caterpillar's body, which

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found in July, as Mr. Samouelle states, in St. James's Park, against trees. We would strongly recommend, to gardeners in general, a closer examination of the stems of their fruit trees, by which many young trees might be saved, and much information accrue to entomologists in that particular branch of the science.—CORRESPONDENT MAG. NAT. HIST.

was to serve as a proper retreat for bringing them to perfection. The reptile thus rudely treated, seemed to bear all very patiently, only moving a little when stung too deeply; which, however, the fly seemed entirely to disregard. I took particular care to feed this caterpillar, which seemed to me to continue as voracious and vigorous as any of the rest of its kind. In about ten or twelve days, it changed into an aurelia, which seemed gradually to decline, and died: upon examining its internal parts, the animal was entirely devoured by worms, which, however, did not come to perfection, as it is probable they had not enough to sustain them within."

What the French philosopher perceived upon this occasion, is every day to be seen in several of the larger kinds of caterpillars, whose bodies serve as a nest to various flies, that very carefully deposit their eggs within them.* The large cabbage caterpillar is so subject to its injuries, that, at certain seasons, it is much easier to find them with than without them. The ichneumon-fly, as it is called, particularly infests these reptiles, and prevents their fecundity. This fly is, of all others, the most formidable to insects of various kinds. The spider, that destroys the ant, the moth, and the butterfly, yet often falls a prey to the ichneumon, who pursues the robber to his retreat, and, despising his nets, tears him in pieces, in the very labyrinth he has made. This insect, as redoubtable as the little quadruped that destroys the crocodile, has received the same name; and, from its destruction of the caterpillar tribe, is probably more serviceable to mankind. This insect, I say, makes the body of the caterpillar the place for depositing its eggs, to the number of ten, fifteen, or twenty. As they are laid in those parts which are not mortal, the reptile still continues to live, and to feed, showing no signs of being incommoded by its new guests. The caterpillar changes its skin, and sometimes undergoes the great change into an aurelia; but still the fatal intruders work within, and secretly devour its internal substance. soon after they are seen bursting through its skin, and moving away, in order to spin themselves a covering, previous to their own little transformation. It is indeed astonishing sometimes to see the number of worms, and those pretty large, that thus issue from the body of a single caterpillar, and eat their way through its skin; but it is more extraordinary still, that they should remain within the body, devouring its entrails, without destroying its life. The truth is, they seem instructed by nature not to devour its vital parts; for they are found to feed only upon that fatty substance which composes the largest part of the caterpillar's body. When this surprising appearance was first observed, it was supposed that the animal thus gave birth to a number of flies, different from itself; and that the same caterpillar sometimes bred an ichneumon, and sometimes a butterfly: but it was not till after more careful inspection it was discovered, that the ichneumon tribe were not the caterpillar's offspring, but its murderers.

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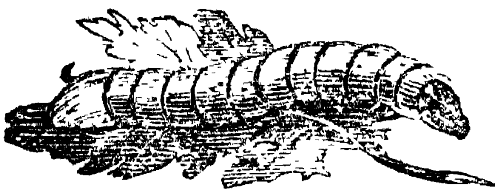
* **Grub Parasite in the Snail.**—The caterpillar is not the only victim of the rapacity of its insect neighbours; Mr. Rennie relates—"During the summer of 1829, we discovered in the hole of a garden post, at Blackheath, one of the larger grey shells (*helix aspersa*, Muller), with three white, soft-bodied grubs, burrowing in the body of the snail. They evidently, from their appearance, belonged to some species of beetle, and we carefully preserved them in order to watch their economy. It appeared to us that they had attacked the snail in its strong hold, while it was laid up torpid for the winter; for more than half of the body was already devoured. They constructed for themselves little cells attached to the inside of the shell, and composed of a sort of fibrous matter, having no distant resemblance to shag tobacco, both in form and smell, and which could be nothing else than the remains of the snail's body. Soon after we took them, appearing to have devoured all that remained of the poor snail, we furnished them with another, which they devoured in the same manner. They formed a cacoon of the same fibrous materials during the autumn and in the end of October appeared in their perfect form, turning out to be the *drilus flavescens*, the grub of which was first discovered in France in 1824. The time of their appearance, it may be remarked, coincides with the period when snails became torpid.—Insect Architecture.

CHAP. V.

THE SILK-WORM.



(The Silk-Worm.)

Having mentioned, in the last chapter, the damages inflicted by the caterpillar tribe, we now come to an animal of this kind, that alone compensates for all the mischief occasioned by the rest. This little creature, which only works for itself, has been made of the utmost service to man, and furnishes him with a covering more beautiful than any other animal can supply. We may declaim indeed against the luxuries of the times, when silk is so generally worn; but were such garments to fail, what other arts could supply their deficiency?

Though silk was anciently brought in small quantities to Rome, yet it was so scarce as to be sold for its weight in gold; and was considered as such a luxurious refinement in dress, that it was infamous for a man to appear in habits of which silk formed but half the composition. It was most probably brought among them from the remotest parts of the east, since it was, at the time of which I am speaking, scarcely known even in Persia.*

Nothing can be more remote from the truth, than the manner in which their historians describe the animal by which silk is produced. Pausanius informs us, that silk came from the country of the Seres, a people of Asiatic Scythia; in which place an insect, as large as the beetle, but in every other respect resembling a spider, was bred up for that purpose. They take great care, as he assures us, to feed and defend it from the weather, as well during the summer's heat, as the rigours of winter. This insect, he observes, makes its web with its feet, of which it has eight in number. It is fed, for the space of four years, upon a kind of paste, prepared for it, and at the beginning of the fifth it is supplied with the leaves of the green willow, of which it is particularly fond. It then feeds till it bursts with fat; after which they take out its bowels, which are spun into the beautiful manufacture so scarce and costly.

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* Introduction of the Use of Silks.—Silk is said to have been first brought from Persia into Greece 323 years before the birth of Christ, and from India into Rome in the year of our Lord 274. During the reign of the Roman emperor, Tiberius, a law was made in the senate, forbidding men to disgrace themselves by wearing silk, which was only fit for women; and so little were the Europeans acquainted with its culture, that it was then supposed to grow upon trees like cotton.

In the year 555, two monks brought from Cerinda, in the East Indies, to Constantinople, the eggs of some silk-worms, which having hatched in a dung-hill, they fed the young insects with mulberry-leaves; and by this management they soon multiplied to such a degree, that manufactories of silk were erected at Constantinople, at Athens, at Thebes, and at Corinth.

In the year 1130, King Roger of Sicily, brought manufacturers of silk from Greece, and settled them at Palermo, where they taught the Sicilians the art of breeding silk-worms, and of spinning and weaving their silk.

From Sicily the art was carried all over Italy, thence to Spain; and a little before the time of Francis I. it reached the south of France.

Henry IV. of France was at great pains to introduce manufactures of silk into his kingdom, and by his perseverance at last brought them to tolerable perfection.

In the year 1286, the ladies of some noblemen first appeared in England in silks, at a ball in Kenilworth Castle, in Warwickshire.

In the year 1620, the art of weaving silk was first introduced into England; and, in the year 1719, Lombe's machine for throwing silk was erected at Derby—a curious piece of mechanism, containing 26,586 wheels turned by water. The perfect model of this machine is now preserved, and to be seen in the Tower of London.

Such was the first introduction of silk into England, which long continued to be too scarce and dear to be applied to common use.

Henry II. of France was the first European who wore silk stockings. In the reign of our Henry VIII. no silk stockings had appeared in England. Edward VI., his son and successor, was presented by Sir Thomas Gresham with the first pair that were ever seen in this country; and the present was, at that time, much talked of as valuable and uncommon.—The Mirror.

The real history of this animal was unknown among the Romans till the time of Justinian; and it is supposed that silkworms were not brought into Europe till the beginning of the twelfth century, when Roger of Sicily brought workmen in this manufacture from Asia Minor, after his return from his expedition to the Holy Land, and settled them in Sicily and Calabria. From these the other kingdoms of Europe learned this manufacture: and it is now one of the most lucrative carried on among the southern provinces of Europe.*

The silk-worm is now very well known to be a large caterpillar, of a whitish colour, with twelve feet, and producing a butterfly of the moth kind. The cone on which it spins, is formed for covering it while it continues in the aurelia state; and several of these, properly wound off, and united together, form those strong and beautiful threads, which is woven into silk. The feeding these worms, the gathering, the winding, and twisting, and the weaving their silk, is one of the principal manufactures of Europe; and, as our luxuries increase, seems every day to become more and more necessary to human happiness.†

There are two methods of breeding silk-worms; for they may be left to grow, and remain at liberty upon the trees where they are hatched, or they may be kept in a place built for that purpose, and fed every day with fresh leaves. The first method is used in China, Tonquin, and other hot countries; the other is used in those places where the animal has been artificially propagated, and still continues a stranger. In the warm climates, the silk-worm proceeds from an egg, which has been glued by the parent moth upon proper parts of the mulberry-tree, and which remains in that situation during the winter. The manner in which they are situated and fixed to the tree, keeps them unaffected by the influence of the weather; so that those frosts which are severe enough to kill the tree, have no power to injure the silk-worm.

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* Silk Manufacture.—In ancient times, the manufacture of silk was confined to the East Indies and China, where the insects that produce it are indigenous. It was thence brought to Europe in small quantities, and in early times sold at so extravagant a price, that it was deemed too expensive even for royalty. The Emperor Aurelian assigned the expense as a reason for refusing his empress a robe of silk; and our own James I., before his accession to the crown of England, had to borrow of the Earl of Mar a pair of silk stockings to appear in before the English ambassador,—a circumstance which probably led him to promote the cultivation of silk in England.—Shaw's Gen. Zoology.

The insect was at length spread into Persia; and eggs were afterwards, at the instance of the Emperor Justinian, concealed in hollow canes by two monks, and conveyed to the isle of Cos. This emperor, in the sixth century, caused them to be introduced into Constantinople, and made an object of public utility. They were thence successively cultivated in Greece, in Arabia, in Spain, in Italy, in France, and in all places where any hope could be indulged of their succeeding. In America, the culture of the silk-worm was introduced into Virginia in the time of James I., who himself composed a book of instructions on the subject, and caused mulberry-trees and silk-worms' eggs to be sent to the colony. In Georgia, also, lands were granted on condition of planting one hundred white mulberry-trees on every ten acres of cleared land.—North American Review.

† Silk Spinners.—There are not only several varieties of the common silk-worm (*bombyx mori*), but other species of caterpillars, which spin silk capable of being manufactured, though not of so good qualities as the common silk. None of our European insects, however, seem to be well fitted for this purpose, though it has been proposed by Fabricius and others to try the crimson under-wing (*catocala sponsa*, Schrank), &c. M. Latreille quotes from the *Recreations of Natural History*, by Wilhelm, the statement that the cocoons of the emperor moth (*saturnia pavonia*) had been successfully tried in Germany, by M. Wentzel Hegeer de Berchtoldsdorf, under an imperial patent.—Insect Architecture.

The insect never proceeds from the egg till nature has provided it a sufficient supply, and till the budding leaves are furnished in sufficient abundance for its support. When the leaves are put forth, the worms seem to feel the genial summons, and bursting from their little eggs, crawl upon the leaves, where they feed with a most voracious appetite. Thus they become larger by degrees; and after some months' feeding, they lay, upon every leaf, small bundles, or cones of silk, which appear like so many golden apples, painted on a fine green ground. Such is the method of breeding them in the east; and without doubt it is best for the worms, and least troublesome for the feeder of them. But it is otherwise in our colder European climates; the frequent changes of the weather, and the heavy dews of our evenings, render keeping them all night exposed subject to so many inconveniences, as to admit of no remedy.* It is true, that by the assistance of nets, they may be preserved from the insults of birds; but the severe cold weather, which often succeeds the first heats of summer, as well as the rain and high winds, will destroy them all; and, therefore, to breed them in Europe, they must be sheltered and protected from every external injury.†

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* Silk-worm in England.—The growth of the silk-worm has also been tried, but with no great success, in this country. Evelyn computed that one mulberry-tree would feed as many silk-worms annually as would produce seven pounds of silk. "According to that estimate," says Barham, "the two thousand trees already planted in Chelsea Park (which take up one-third of it) will make 14,000 lbs. weight of silk; to be commonly worth but twenty shillings a pound, those trees must make 14,000*l.* per annum." During the last century, some French refugees in the south of Ireland made considerable plantations of the mulberry, and had begun the cultivation of silk with every appearance of success; but since their removal the trees have been cut down. In the vicinity of London, also, a considerable plantation of mulberry-trees were purchased by the British, Irish, and Colonial Silk Company in 1825; but we have not learned whether this company have any active measures now in operation.

The manufacture of silk was introduced into this country in 1718, at Derby, by Mr. John Lombe, who travelled into Italy to obtain the requisite information; but so jealous were the Italians of this, that, according to some statements, which have obtained belief, he fell a victim to their revenge, having been poisoned at the early age of twenty-nine.—Insect Architecture.

† Effects of Cold on Insects.—It is remarkable the extreme of cold to which insects and their eggs will be subjected ere the vital principle is destroyed. Spallanzani observes that—"Intense cold does not destroy the eggs of insects. The year 1709, when Fahrenheit's thermometer fell to 1°, is celebrated for its rigour and its fatal effects on plants and animals. Who can believe, exclaims Boerhaave, that the severity of this winter did not destroy the eggs of insects, especially those exposed to its influence in the open fields, on the naked earth, or on the branches of trees? Yet, when the spring had tempered the air, these eggs produced as they usually did after the mildest winters. Since that period there have been winters more severe. In France, during December, 1788, the thermometer fell considerably lower, and in several other temperate European climates.

"I have exposed eggs to a more rigorous trial than the winter of 1709. Those of several insects, and among others the silk-worm, moth, and elm butterfly (*vanessa polychloros?*) were inclosed in a glass vessel and buried five hours in a mixture of ice and sal gem (rock salt); the thermometer fell 6° below zero. In the middle of the following spring, however, caterpillars came from all the eggs, and at the same time as from those that had suffered no cold. In the following year, I submitted them to an experiment still more hazardous. A mixture of ice and sal gem with the fuming spirit of nitre (*nitrate of ammonia*), reduced the thermometer 22° below zero, that is 23° lower than the cold of 1709. They were not injured, as I had evident proof by their being hatched.

"Combining all these facts, we conclude that cold is less noxious to germs and eggs, than to animalcula and insects. Germs in general can support 2° below zero; whereas of animalcula some die at the freezing point, and some at about 20°. The eggs of many insects continue fertile after being subjected to a temperature of 22° below zero, while insects themselves die at 16° and 14°. This I have ascertained in the eggs of the silk-worm moth, and of the elm butterfly; and although there are caterpillars and chrysalides able to resist great cold, I have uniformly found it to be in a less degree than what can be resisted by their eggs. What can be the cause of so great a difference? Insects killed at 16° and 14° are so penetrated and frozen by the cold, that their members do not yield to the pressure of the finger, and seem perfect ice under the knife. This

For this purpose, a room is chosen with a south aspect, and the windows are so well glazed, as not to admit the least air; the walls are well built, and the planks of the floor exceedingly close, so as to admit neither birds nor mice, nor even so much as an insect. In the middle there should be four pillars erected, or four wooden posts, so placed as to form a pretty large square. Between these are different stories made with ozier hurdles, and under each hurdle there should be a floor, with an upright border all round. These hurdles and floors must hang upon pulleys, so as to be placed or taken down at pleasure.

When the worms are hatched, some tender mulberry-leaves are provided, and placed in the cloth or paper box in which the eggs were laid, and which are large enough to hold a great number. When they have acquired some strength, they must be distributed on beds of mulberry-leaves, in the different stories of the square in the middle of the room, round which a person may freely pass on every side. They will fix themselves to the leaves, and afterwards to the sticks of the hurdles, when the leaves are devoured. They have then a thread, by which they can suspend themselves on occasion, to prevent any shock by a fall; but this is by no means to be considered as the silk which they spin afterwards in such abundance. Care must be taken that fresh leaves be brought every morning, which must be strewed very gently and equally over them; upon

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does not happen to eggs, though subjected to cold of much greater intensity. Their contents remain fluid, even at the greatest cold, as may be seen by crushing them with the nail. Perhaps this is derived from constituent spirituous or oleaginous parts, or from some principle adapted to abate the power of cold. If eggs do not freeze, it is probable the included embryos do not freeze. Is there anything wonderful, therefore, that they then survive cold which is fatal to them when produced? Probably for the same reason (and I see no objection that can apply), animalcula, concentrated in the germ, can support a degree of cold they are incapable of when developed.

"As the temperature of freezing still retains a portion of heat, why, it may be asked, should it not develope the germs of the most minute animalcula? Had we never seen any eggs hatched but those of birds, which require 104°, we should have concluded that all others require the same. A little initiation into the study of minute animals teaches how many kinds produce at a temperature infinitely less. Such are the eggs of butterflies and many other insects, of frogs, lizards, tortoises, down to some, as those of toads, which I have seen produce at 45°. If these eggs hatch at 59° less than is required by those of birds, what repugnance will there be to suppose that at 13° less, or the freezing point, the eggs of other animals may be hatched? Nor should it surprise me to be told of animals whose eggs would produce at much greater cold, after knowing that there are plants, beings so similar to animals, and many of them, which amidst the rigours of winter flourish and fructify."

It is remarked by John Hunter, that an egg will freeze by a great degree of cold; at the same time there seems to be a living principle which enables it to support cold without destruction, and when once that principle is destroyed, cold more easily operates. An egg was thus frozen by the cold of zero; after thawing and again exposing it to the same degree of cold, it froze seven minutes and a half sooner. A new-laid egg took an hour to freeze in 15° and 17°, but when thawed, it froze at 25° in half the time.

The principle of vitality, therefore, whatever may be the cause, is evidently less easily destroyed in the egg state than in the perfect animal; and, therefore, the inference that a rigorous winter promises a diminution of insects in the summer succeeding commonly proves erroneous. On the contrary, recorded facts prove that they are sometimes even more abundant than usual after severe frosts. During the present spring of 1830, accordingly, notwithstanding the severe frosts of the preceding winter, we have observed a much greater number of insects, even of the smaller and more delicate kinds (*aleyrodes*, *corethra*, *alucita*, *&c.*) as well as of larvæ, both those just hatched, and those which have lived through the winter, than last year, when the frost was not so severe. We were particularly struck with the larvæ of some small tipula (*boletophila ?*), which we found in abundance in Birch-wood, Kent, feeding on a fungus (*boletus fomentarius*, Fries), and which were so beautifully transparent and soft, that we could not understand how they had escaped being frozen. It is not a little remarkable, in connexion with this, that the migratory birds seem to have been aware of this abundance of insects by their appearing earlier than usual. We saw a pair of nightingales at Greenhithe on the 21st of March, and a number of swallows the same week at Lee,—which is two or three weeks before their average time.—Insect Trans.

which the silk-worms will forsake the remainder of the old leaves, which must be carefully taken away, and everything kept very clean; for nothing hurts these insects so much as moisture and uncleanliness. For this reason the leaves must be gathered when the weather is dry, and kept in a dry place, if it be necessary to lay in a store. As these animals have but a short time to live, they make use of every moment, and almost continually are spinning, except at those intervals when they change their skins. If mulberry-leaves be difficult to be obtained, the leaves of lettuce or holyoak will sustain them; but they do not thrive so well upon their new diet, and their silk will neither be so copious nor of so good a quality.

The worm, at the time it bursts the shell, is extremely small, and of a black colour, but the head is of a more shining black than the rest of the body; some days after, they begin to turn whitish, or of an ash-coloured grey. After the skin begins to grow too rigid, or the animal is stinted with it, the insect throws it off, and appears clothed anew; it then becomes larger and much whiter, though it has a greenish cast: after some days, which are more or less, according to the different heat of the climate, or to the quality of the food, it leaves off eating, and seems to sleep for two days together; then it begins to stir, and put itself into violent motions, till the skin falls off the second time, and is thrown aside by the animal's feet. All these changes are made in three weeks or a month's time; after which it begins to feed once more, still in its caterpillar form, but a good deal differing from itself before its change. In a few days' time it seems to sleep again; and, when it awakes, it again changes its clothing, and continues feeding as before. When it has thus taken a sufficiency of food, and its parts are disposed for assuming the aurelia form, the animal forsakes, for the last time, all food and society, and prepares itself a retreat to defend it from external injuries, while it is seemingly deprived of life and motion.

This retreat is no other than its cone, or ball of silk, which nature has taught it to compose with great art, and within which it buries itself till it assumes its winged form. This cone or ball is spun from two, little, longish kind of bags that lie above the intestines, and are filled with a gummy fluid, of a marigold colour. This is the substance of which the threads are formed; and the little animal is furnished with a surprising apparatus for spinning it to the degree of fineness which its occasions may require. This instrument in some measure resembles a wire-drawer's machine, in which gold or silver threads are drawn to any degree of minuteness; and through this the animal draws its threads with great assiduity. As every thread proceeds from two gum-bags, it is probable that each supplies its own, which, however, are united as they proceed from the animal's body. If we examine the thread with a microscope, it will be found that it is flatted on one side, and grooved along its length; from hence we may infer, that it is doubled just upon leaving the body, and that the two threads stick to each other by that gummy quality of which they are possessed. Previous to spinning its web, the silk-worm seeks out some convenient place to erect its cell, without any obstruction. When it has found a leaf, or a chink fitted to its purpose, it begins to wreathe its head in every direction, and fastens its thread on every side to the sides of its retreat. Though all its first essays seem perfectly confused, yet they are not altogether without design: there appears, indeed, no order or contrivance in the disposal of its first threads; they are by no means laid artfully over each other, but are thrown out at random, to serve as an external shelter against rain; for nature having appointed the animal to work upon trees in the open air, its habits remain, though it is brought up in a warm apartment.

Malpighi pretends to have observed six different layers in a single cone of silk; but what may easily be observed is, that it is composed externally of a kind of rough cotton-like substance, which is called floss; within, the thread is more distinct and even; and next the body of the aurelia, the apartment seems lined with a substance of the hardness of paper, but of a much stronger consistence. It must not be supposed that the thread which goes to compose the cone is rolled round as we roll a bottom; on the contrary, it lies upon it in a very irregular manner, and winds off now from one side of the cone and then from the other. This whole thread, if measured, will be found about three hundred yards long, and so very fine, that eight or ten of them are generally rolled off into one by the manufacturers.[*] The cone, when completed, is in form like a pigeon's egg, and more pointed at one end than the other; at the smaller end the head of the aurelia is generally found; and this is the place that the insect, when converted into a moth, is generally seen to burst through.

It is generally a fortnight or three weeks before the aurelia is changed into a moth; but no sooner is the winged insect completely formed, than, having divested itself of its aurelia skin, it prepares to burst through its cone, or outward prison: for this purpose it extends its head towards the point of the cone, butts with its eyes, which are rough, against the lining of its cell, wears it away, and at last pushes forward, through a passage which is small at first, but which enlarges as the animal increases its efforts for emancipation, while the tattered remnants of its aurelia skin lie in confusion within the cone, like a bundle of dirty linen.[†]

The animal, when thus set free from its double confinement, appears exhausted with fatigue, and seems produced for no other purpose but to transmit a future brood. It neither flies nor eats; the male only seeking the female, whose eggs he impregnates, and their union continues for four days, without interruption. The male dies immediately after separation from his mate, and she survives him only till she has laid her eggs, which are not hatched into worms till the ensuing spring.

However, there are few of these animals suffered to come to a state of maturity; for, as their bursting through the cone destroys the silk, the manufacturers take care to kill the aurelia, by exposing it to the sun, before the moth comes to perfection. This done, they take off the floss, and throw the cones into warm water, stirring them till the first thread offers them a clue for winding all off. They generally take eight of the silken threads together, the cones still kept under water, till a proper quantity of the silk is wound off: however, they do not take all, for the latter parts grow weak, and are of a bad colour. As to the paper-like substance which remains, some stain it with a variety of colours, to make artificial flowers, others let it lie in the water, till the glutinous matter which cements it is all dissolved; it is then carded like wool, spun with a wheel, and converted into silk stuffs of an inferior kind.[‡]

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[*] Length and Quantity of Thread Spun.—The length of the unbroken thread in a cocoon varies from six hundred to a thousand feet; and as it is all spun double by the insect, it will amount to nearly two thousand feet of silk, the whole of which does not weigh above three grains and a half: five pounds of silk from ten thousand cocoons is considerably above the usual average. When we consider, therefore, the enormous quantity of silk which is used at present, the number of worms employed in producing it will almost exceed our comprehension. The manufacture of the silk, indeed, gives employment, and furnishes subsistence, to several millions of human beings; and we may venture to say, that there is scarcely an individual in the civilized world who has not some article made of silk in his possession.—Insect Architecture.

[†] The Moth Bursting.—Réaumur was of opinion that the moth makes use of its eyes as a file, in order to effect its passage through the silk; while Malpighi, Peck, and others, believe that it is assisted by an acid which it discharges in order to dissolve the gum that holds the fibres of the silk together. Mr. Swayne denies that the threads are broken at all, either by filing or solution; for he succeeded in unwinding a whole cocoon from which the moth had escaped. The soiling of the cocoon by a fluid, however, we may remark, is no proof of the acid; for all moths and butterflies discharge a fluid when they assume wings, whether they be inclosed in a cocoon or not; but it gives no little plausibility to the opinion, that "the end of the cocoon is observed to be wetted for an hour, and sometimes several hours, before the moth makes its way out." Other insects employ different contrivances for escape.—Insect Architecture.

[‡] Disease of Silk-worms and its Cure.—In the southern parts of France, where silk-worms are raised, it is very common to observe the insects attacked by a disease called the jaundice, in consequence of the colour acquired by them. Very careful examination is continually made for the discovery of such worms as may be attacked by

CHAP. I.

THE FOURTH ORDER OF INSECTS.

In the foregoing part we treated of caterpillars changing into butterflies; in the present will be given the history of grubs changing into their corresponding winged animals. These, like the former, undergo their transformation, and appear as grubs or maggots, as aurelias, and at last as winged insects. Like the former, they are bred from eggs; they feed in their reptile state; they continue motionless and lifeless, as aurelias; and fly and propagate, when furnished with wings. But they differ in many respects: the grub or maggot wants the number of feet which the caterpillar is seen to have; the aurelia is not so totally wrapped up, but that its feet and its wings appear. The perfect animal, when emancipated, also has its wings either cased, or transparent, like gauze; not coloured with that beautifully painted dust which adorns the wings of the butterfly.

In this class of insects, therefore, we may place a various tribe, that are first laid as eggs, then are excluded as maggots or grubs, then change into aurelias, with their legs and wings not wrapped up, but appearing; and lastly, assuming wings, in which state they propagate their kind. Some of these have four transparent wings, as bees; some have two membranous cases to their wings, as beetles; and some have but two wings, which are transparent, as ants. Here, therefore, we will place the bee, the wasp, the humble bee, the ichneumon fly, the gnat, the tipula, or longlegs, the beetle, the may-bug, the glow-worm, and the ant. The transformations which all these undergo, are pretty nearly similar; and though very different animals in form, are yet produced nearly in the same manner.

CHAP. II.

THE BEE.

To give a complete history of this insect in a few pages; which some have exhausted volumes in describing, and whose nature and properties still continue in dispute, is impossible. It will be sufficient to give a general idea of the animal's operations; which, though they have been studied for more than two thousand years, are still but incompletely known.

There are three different kinds of bees in every hive. First, the labouring

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it, that they may be removed, lest the disease, being contagious, should spread to the others.

The Abbé Eysseric of Carpentras had recourse to a remedy in these cases, which, though apparently dangerous, had been warranted by the success of twenty years. He used to powder his worms over with quick lime by means of a silk sieve; he then gave them mulberry-leaves moistened with a few drops of wine, and the insects instantly set about devouring the leaves with an eagerness which they did not usually show. Not one of the hurdles upon which he raised his worms appeared infected with the jaundice. It was at first supposed, that the cocoons of silk were injured by this process; this, however, is not the case, and his method of practice is now adopted generally in the department of Vaucluse.—Bull. Univ.

bees, which make up the far greatest number, and are thought to be neither male nor female, but merely born for the purposes of labour, and continuing the breed, by supplying the young with provision, while yet in their helpless state. The second sort are the drones; they are of a darker colour, longer, and more thick by one-third than the former: they are supposed to be the males; and there is not above a hundred of them in a hive of seven or eight thousand bees. The third sort is much larger than either of the former, and still fewer in number: some assert, that there is not above one in every swarm; but this later observers affirm not to be true, there being sometimes five or six in the same hive.* These are called queen-bees, and are said to lay all the eggs from which the whole swarm is hatched in a season.

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* **Nurse-Bees and Wax-Workers.**—It has long been known that the bees of a hive consist of three sorts, which were ascertained by M. Réaumur to be distinguished as workers or neuters, constituting the bulk of the population; drones or males, the least numerous class; and a single female, the queen and mother of the colony. Schirach subsequently discovered the very extraordinary fact, which Huber and others have proved beyond doubt, that when a hive is accidentally deprived of a queen, the grub of a worker can be, and is fed, in a particular manner, so as to become a queen and supply the loss. But another discovery of M. Huber is of more importance to the subject of architecture now before us. By minute research he ascertained, that the workers, which had been considered by former naturalists to be all alike, are divided into two important classes, nurse-bees and wax-makers.

The *nurse-bees* are rather smaller than the wax-workers, and even when gorged with honey their bellies do not, as in the others, appear distended. Their business is to collect honey, and impart it to their companions; to feed and take care of the young grubs, and to complete the combs and cells which have been founded by the others; but they are not charged with provisioning the hive.

The *wax-workers*, on the other hand, are not only a little larger, but their stomachs, when gorged with honey, are capable of considerable distension, as M. Huber proved by repeated experiments. He also ascertained that neither of the species can alone fulfil all the functions shared among the workers of a hive. He painted those of each class with different colours, in order to study their proceedings, and their labour was not interchanged. In another experiment, after supplying a hive deprived of a queen with brood and pollen, he saw the nurse-bees quickly occupied in the nutrition of the grubs, while those of the wax-working class neglected them. When hives are full of combs, the wax-workers disgorge their honey into the ordinary magazines, making no wax: but if they want a reservoir for its reception, and if their queen does not find cells ready made wherein to lay her eggs, they retain the honey in the stomach, and in twenty-four hours they produce wax. Then the labour of constructing combs begins.

It might, perhaps, be supposed, that when the country does not afford honey, the wax-workers consume the provision stored up in the hive. But they are not permitted to touch it. A portion of honey is carefully preserved, and the cells containing it are protected by a waxen covering, which is never removed except in case of extreme necessity, and when honey is not to be otherwise procured. The cells are at no time opened during summer; other reservoirs, always exposed, contribute to the daily use of the community; each bee, however, supplying itself from them with nothing but what is required for present wants. Wax-workers appear with large bellies at the entrance of their hive, only when the country affords a copious collection of honey. From this it may be concluded, that the production of the waxy matter depends on a concurrence of circumstances not invariably subsisting. Nurse-bees also produce wax, but in a very inferior quantity to what is elaborated by the real wax-workers. Another characteristic whereby an attentive observer can determine the moment of bees collecting sufficient honey to produce wax, is the strong odour of both these substances from the hive, which is not equally intense at any other time. From such data, it was easy for M. Huber to discover whether the bees worked in wax in his own hives, and in those of the other cultivators of the district.

There is still another sort of bees, first observed by Huber in 1809, which appear to be only casual inmates of the hive, and which are driven forth to starve, or are killed in conflict. They closely resemble the ordinary workers, but are less hairy, and of a much darker colour. These have been called *black bees*, and are supposed by Huber to be defective bees; but Kirby and Spence conjecture that they are toil-worn, superannuated workers, of no farther use, and are therefore sacrificed, because burdensome to a community which tolerates no unnecessary inmates. The very great numbers of black bees, however, which sometimes appear, does

In examining the structure of the common working bee, the first remarkable part that offers is the trunk, which serves to extract the honey from flowers. It is not formed, like that of other flies, in the manner of a tube, by which the fluid is to be sucked up: but like a besom, to sweep, or a tongue, to lick it away. The animal is furnished also with teeth, which serve it in making wax. This substance is gathered from flowers, like honey; it consists of that dust or farina which contribute to the fecundation of plants, and is moulded into wax by the little animal, at leisure. Every bee, when it leaves the hive to collect this precious store, enters into the cup of the flower, particularly such as seem charged with the greatest quantities of this yellow farina. As the animal's body is covered over with hair, it rolls itself within the flower, and soon becomes quite covered with the dust, which it soon after brushes off with its two hind legs, and kneads it into two little balls. In the thighs of the hind legs there are two cavities, edged with hair; and into these, as into a basket, the animal sticks its pellets. Thus employed, the bee flies from flower to flower, increasing its store, and adding to its stock of wax; until the ball, upon each thigh, becomes as big as a grain of pepper: by this time, having got a sufficient load, it returns, making the best of its way to the hive.

The belly of the bee is divided into six rings, which sometimes shorten the body, by slipping one over the other. It contains within it, beside the intestines, the honey-bag, the venom-bag, and the sting. The honey-bag is as transparent as crystal, containing the honey that the bee has brushed from the flowers; of which the greater part is carried to the hive, and poured into the cells of the honey-comb; while the remainder serves for the bee's own nourishment: for, during summer, it never touches what has been laid up for the winter.* The sting, which serves to defend this little animal from its enemies, is composed of three parts; the sheath, and two darts, which are extremely small and penetrating. Both the darts have several small points, or barbs, like those of a fish-hook, which renders the sting more painful, and makes the darts rankle in the wound. Still, however, this instrument would be very slight, did not the bee poison the wound. The sheath, which has a sharp point, makes the

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not well accord with such an opinion. The subject remains, therefore, still in uncertainty. —Insect Architecture.

The Worker-Bee.—The first stomach of the worker-bee, according to Latreille, is appropriated to the reception of honey, but this is never found in the second stomach, which is surrounded with muscular rings, and from one end to the other very much resembles a cask covered with hoops. It is within these rings that the wax is produced, but the secreting vessels for this purpose have hitherto escaped the researches of the acutest naturalists. Huber, however, plausibly enough conjectures that they are contained in the internal lining of the wax pockets, which consists of a cellular substance reticulated with hexagons. The wax pockets themselves, which are concealed by the over-lapping of the rings, may be seen by pressing the abdomen of a worker-bee so as to lengthen it, and separate the rings further from each other. When this has been done, there may be seen on each of the four intermediate hoops of the belly, and separated by what may be called the keel (*carina*), two whitish-coloured pouches, of a soft texture, and in the form of a trapezium. Within, the little scales or plates of wax are produced from time to time, and are removed and employed as we shall presently see. We may remark that it is chiefly the wax-workers which produce the wax, for though the nurse-bees are furnished with wax-pockets, they secrete it only in very small quantities, while in the queen-bee, and the males or drones, no pockets are discoverable.—Insect Architecture.

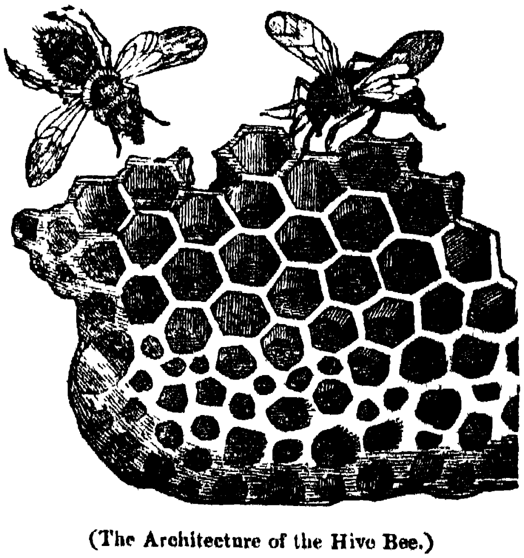
* The Sting of the Bee.—That the sting of a bee is a formidable weapon, many have found to their cost; yet few, perhaps, even among those who have suffered from it, are aware of the exquisite skill which the great Maker of all has shown in its construction.

The sting is placed within a horny sheath, or scabbard, which ends in a sharp point, and is so slit as to open and permit the sting to be thrust out. The sting consists of two small darts, one rather longer than the other, very sharp and barbed. In stinging, the sheath is first pushed through the skin, and then the longer dart into the flesh, in which it is held fast by the barbs; the other dart follows, and so on till the whole sting is buried in the flesh. Poison is then poured through the sheath into the wound, and produces swelling and pain.

first impression; which is followed by that of the darts, and then the venomous liquor is poured in. The sheath sometimes sticks so fast in the wound, that the animal is obliged to leave it behind; by which the bee soon after dies, and the wound is considerably inflamed. It might at first appear well for mankind, if the bee were without its sting; but, upon recollection, it will be found that the little animal would then have too many rivals in sharing its labours. A hundred other lazy animals, fond of honey, and hating labour, would intrude upon the sweets of the hive; and the treasure would be carried off, for want of armed guardians to protect it.

From examining the bee singly, we now come to consider it in society, as an animal not only subject to laws, but active, vigilant, laborious, and disinterested. All its provisions are laid up for the community; and all its arts in building a cell, designed for the benefit of posterity. The substance with which bees build their cells is wax; which is fashioned into convenient apartments for themselves and their young. When they begin to work in their hives, they divide themselves into four companies. one of which roves in the fields in search of materials; another employs itself in laying out the bottom and partitions of their cells: a third is employed in making the inside smooth from the corners and angles; and the fourth company bring food for the rest, or relieve those who return with their respective burthens. But they are not kept constant to one employment; they often change the tasks assigned them: those that have been at work, being permitted to go abroad; and those that have been in the fields already, take their places. They seem even to have signs, by which they understand each other; for when any of them wants food, it bends down its trunk to the bee from whom it is expected, which then opens its honey-bag, and lets some drops fall into the other's mouth, which is at that time opened to receive it. Their diligence and labour are so great, that, in a day's time, they are able to make cells, which lie upon each other, numerous enough to contain three thousand bees.

If examined through a glass hive, from the hurry the whole swarm is in, the whole at first appears like anarchy and confusion: but the spectator soon finds every animal diligently employed, and following one pursuit, with a settled purpose. Their teeth are the instruments by which they model and fashion their various buildings, and give them such symmetry and perfection. They begin at the top of the hive; and several of them work at a time, at the cells which have two faces. If they are stinted with regard to time, they give the new cells but half the depth which they ought to have; leaving them imperfect, till they have sketched out the number of cells necessary for the present occasion. The construction of their combs costs them a great deal of labour; they are made by insensible additions; and not cast at once in a mould, as some are apt to imagine. There seems no end of their shaping, finishing, and turning them neatly up. The cells for their young are most carefully formed; those designed for lodging the drones, are larger than the rest; and that for the queen-bee, the largest of all. The cells in which the young brood are lodged, serve at different times for containing honey; and this proceeds from an obvious cause: every worm, before it is transformed into an aurelia, hangs its old skin on the partitions of its cell; and thus, while it



(The Architecture of the Hive Bee.)

strengthens the wall, diminishes the capacity of its late apartment. The same cell, in a single summer, is often tenanted by three or four worms in succession; and the next season, by three or four more. Each worm takes particular care to fortify the pannels of its cell, by hanging up its spoils there: thus, the partitions being lined, six or eight deep, become at last too narrow for a new brood, and are converted into store-houses for honey.

Those cells where nothing but honey is deposited, are much deeper than the rest. When the harvest of honey is so plentiful that they have not sufficient room for it, they either lengthen their combs, or build more; which are much longer than the former. Sometimes they work at three combs at a time; for, when there are three work-houses, more bees may be thus employed, without embarrassing each other.*

But honey, as was before observed, is not the only food upon which these animals subsist. The meal of flowers, of which their wax is formed, is one of their most favourite repasts. This is a diet which they live upon during the summer; and of which they lay up a large winter provision. The wax of which their combs are made, is no more than this meal digested, and wrought into a paste. When the flowers upon which bees generally feed, are not fully blown, and this meal or dust is not offered in sufficient quantities, the bees pinch the tops of the stamina in which it is contained, with their teeth; and thus anticipate the progress of vegetation. In April and May, the bees are busy from morning to evening, in gathering this meal; but when the weather becomes too hot in the midst of summer, they work only in the morning.

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* Cotton Gathering Bee. — A species of solitary bee (*Anthidium manicatum*, Fabricius), by no means uncommon with us, forms a nest of a peculiarly interesting structure. Kirby and Spence say, that it does not excavate holes, but makes choice of the cavities of old trees, key-holes, and similar localities; yet it is highly probable, we think, that it may sometimes scoop out a suitable cavity when it cannot find one; for its mandibles seem equally capable of this, with those of any of the carpenter or mason bees.

Be this as it may, the bee in question having selected a place suitably sheltered from the weather, and from the intrusion of depredators, proceeds to form her nest, the exterior walls of which she forms of the wool of pubescent plants, such as rose-campion (*Lychnis coronaria*), the quince (*Pyrus cydonia*), cats-ears (*Stachys lanata*), &c. "It is very pleasant," says Mr. White of Selborne, "to see with what address this insect strips off the down, running from the top to the bottom of the branch, and shaving it bare with all the dexterity of a hoop shaver. When it has got a vast bundle, almost as large as itself, it flies away, holding it secure between its chin and its fore-legs."

The manner in which the cells of the nest are made, seems not to be very clearly understood. M. Latrielle says, that after constructing her nest of the down of quince leaves, she deposits her eggs, together with a store of paste, formed of the pollen of flowers, for nourishing the grubs. Kirby and Spence, on the other hand, tell us, that "the parent bee, *after* having constructed her cells, laid an egg in each, and filled them with a store of suitable food, plasters them with a covering of vermiform masses, apparently composed of honey and pollen: and having done this, aware, long before Count Rumford's experiments, what materials conduct heat most slowly," she collects the down from wooly plants, and "sticks it upon the plaster that covers her cells, and thus closely envelopes them with a warm coating of down, impervious to every change of temperature." "From later observations," however, they are "inclined to think that these cells may possibly, as in the case of the humble-bee, be in fact formed by the larva previously to becoming a pupa, after having eaten the provision of pollen and honey with which the parent bee had surrounded it. The vermicular shape, however, of the masses with which the cases are surrounded, does not seem easily reconcileable with this supposition, unless they are considered as the excrement of the larva."

Whether or not this second explanation is the true one, we have not the means of ascertaining; but we are almost certain the first is incorrect, as it is contrary to the regular procedure of insects to begin with the interior part of any structure, and work outwards. We should imagine, then, that the down is first spread out into the form required, and afterwards plastered on the inside to keep it in form, when probably the grub spins the vermicular cells previous to its metamorphosis.

It might prove interesting to investigate this more minutely; and, as the bee is by no means scarce in the neighbourhood of London, it might not be difficult for a careful observer to witness all the details of this singular architecture. The bee may be readily known from its congeners, by its being about the size of the hive-bee, but more broad and flattened, blackish brown above, with a row of six yellow or white spots along each side of the rings, very like the rose-leaf cutter, and having the belly covered with yellowish brown hair, and the legs fringed with long hairs of a rather lighter colour. — Insect Architecture.

The bee is furnished with a stomach for its wax, as well as its honey. In the former of the two, their powder is altered, digested, and concocted into real wax; and is thus ejected by the same passage by which it was swallowed. Every comb, newly made, is white: but it becomes yellow as it grows old, and almost black when kept too long in the hive. Besides the wax thus digested, there is a large portion of the powder kneaded up for food in every hive, and kept in separate cells, for winter provision. This is called, by the country people, bee-bread; and contributes to the health and strength of the animal during winter.* Those who rear bees may rob them of their honey, and feed

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* Hybernation of Bees.—The bee is popularly believed to hybernate, the seven winter sleepers being said to be, "the bat, the bee, the butterfly, the cuckoo, and the three swallows;" but, like many of the popular notions on natural history, this is almost wholly erroneous; for at least, out of these seven, the four birds certainly do not become torpid. With respect to the bee, again, we find some of the most distinguished observers at variance. Réaumur is an advocate for the popular opinion. "It has been established," he says, "with a wisdom, which we cannot but admire,—with which every thing in nature has been made and ordained,—that during the greater part of the time in which the country furnishes nothing to bees, they have no longer need to eat. The cold which arrests the vegetation of plants—which deprives our fields and meadows of their flowers—throws the bees into a state in which nourishment ceases to be necessary to them: it keeps them in a sort of torpidity, in which no transpiration from them takes place, or at least during which the quantity of what transpires is so inconsiderable, that it cannot be restored by aliment without their lives being endangered. In winter, while it freezes, we may observe without fear the interior of hives that are not of glass; for we may lay them on their sides, and even turn them bottom upwards, without putting any bee into motion. We see the bees crowded and closely pressed one against the other; little space then suffices for them."—Again, when mentioning the custom of putting bee-hives during the winter into outhouses and cellars, he says, "that in such situations, the air, though more temperate than out of doors, during the greater part of the winter, is yet sufficiently cold to keep the bees in that species of torpidity which does away with the necessity of their eating." He also says, positively, that the milder the weather, the more risk there is of the bees consuming their honey before the spring, and dying of hunger; confirming his position by an account of a striking experiment, in which a hive that he transferred during winter into his study, where the temperature was usually, in the day, 10° or 12° of Réaumur's thermometer above freezing, or 59° Farenheit, though the bees were provided with a plentiful supply of honey, that if they had been in a garden would have served past the end of April, had consumed nearly their whole stock before the end of February.

But the elder Huber records some observations directly opposed to these, affirming, unequivocally, that, so far from being torpid in winter, the heat, in a well peopled hive, is as high as 25° Réaumur, or 86° Farenheit, even when the thermometer in the open air is several degrees below zero, the heat thus observed being generated in the hive by their clustering together, and keeping themselves in motion; and even in the middle of winter they may be heard buzzing, as they always do when ventilating the hive,—a process which appears to have been originally discovered by Huber, and of which, on account of its connexion with the disputed question before us, we shall give his own description:—

"During the fine weather," (in summer), says he, "a certain number of bees always appear before the entrance of the hive, occupied in vibrating their wings, but still more are found to be engaged in ventilating the interior. The ordinary place of ventilation is on the board; those outside of the entrance have their heads towards it; those within have them in the opposite direction.

"We may affirm that they arrange themselves regularly to ventilate more at ease, thus forming files, which terminate at the entrance, and sometimes disposed like so many diverging rays. This order is not uniform, but is probably owing to the necessity for the ventilating bees giving way to those going and coming, whose rapid course compels them to range themselves in a file, to avoid being hurt or overthrown every instant

"Sometimes above twenty bees ventilate at the bottom of a hive, at other times their

them, during the winter, with treacle; but no proper substitute has yet been found for the bee-bread; and without it, the animals become consumptiv and die.

As for the honey, it is extracted from that part of the flower called the nectarium. From the mouth this delicious fluid passes into the gullet; and then into the first stomach, or honey-bag, which, when filled, appears like an oblon bladder. Children, that live in country places, are well acquainted with thi bladder; and destroy many bees to come at their store of honey. When a be has sufficiently filled its first stomach, it returns back to the hive, where it disgorges the honey into one of the cells. It often happens that the bee deliver its store to some other, at the mouth of the hive, and flies off for a fresh supply Some honey-combs are always left open for common use; but many others ar stopped up, till there is a necessity of opening them. Each of these are covere carefully with wax, so close, that the covers seem to be made at the very instan the fluid is deposited within them.*

number is more circumscribed, and their employment of various duration. We have seen them engaged in it during twenty-five minutes, only taking breath, as it were, by the shortest interruption of the vibration. On ceasing, they are succeeded by others, so that there is never any intermission of the buzzing of a populous hive.

"If under the necessity of ventilating during winter, being then united near the centre of the mass towards the top of their dwelling, doubtless the bees perform this important function among vacuities of the irregular combs, where there is room for their wings to expand, as at least half an inch is requisite for them to play freely.

"The ventilation of the bees, or the buzzing which denotes it, seems to me more active during winter than at any other time. It was easy to prove that this operation established a current of air; for anemometers of light paper or cotton, hung by a thread, were impelled towards the entrance, and repelled from it, with equal rapidity. The action on them never was entirely interrupted, and its force appeared proportional to the number of bees fanning themselves.

"If some cultivators of bees shut up the entrance of their hives in winter without prejudice to the bees, it must be considered that the air will penetrate through the straw composing them. I confided an experiment on this to M. Burnens, then at a distance from me. Having closed down a very populous straw hive fast on its board, he found that a piece of the finest paper, suspended by a hair before the entrance, oscillated above an inch off the perpendicular line. He poured liquid honey through an opening in the top, when a buzzing soon began, and a tumult increasing within, several bees departed. The oscillations now became stronger and more frequent. His experiments were made at three o'clock, the sun shining, and the thermometer, in the shade, standing at 44°."

Swammerdam also seems to indicate that bees remain active during the winter, and i order to enable them to bear its inclemency they both fortify their hive and provide store of honey. "The order," he says, "i which bees that live in the winter month conduct themselves is this: they first ope the cells and eat the honey deposited in th lowest part of the hive, ascending by degrees to the upper parts. This they do in order t preserve a mutual warmth between them; and the female deposits her eggs in the little cells as they are emptied. Therefore I discovered both stock and nymphs about the beginning of March. Let no one be surprised at this, since towards the beginning of August I have seen some thousand eggs inclosed in the ovary of a female bee; so that it is natural for the bees at any time of the year to lay their eggs and increase their family.

John Hunter, whose authority stands as high as any on record, found a hive to grow lighter in a cold than in a warm week of winter, and that a hive, from November 10th till February 9th, lost more than four pounds in weight; a loss which could not well be ascribed to evaporation.

These discrepancies among naturalists so distinguished as both shrewd and faithful observers, forbid us, we think, to come to any decided conclusion on the subject, till further researches and experiments have been made. It is not improbable, however, that the truth lies in the middle between the two extremes,—for it is quite accordant with what we know both of insects and other animals, that a high degree of cold should render them torpid, while they may continue [illegible] if there should be a certain degree of [illegible] —INSECT TRANSFORMATIONS.

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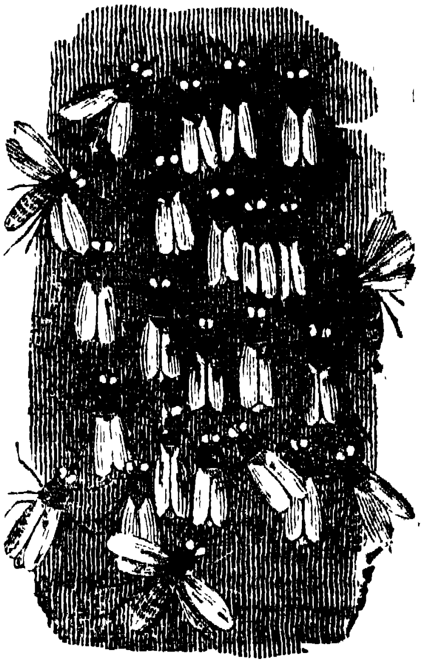
* CURIOUS FACT IN THE ECONO[illegible] BEES.—When two or three distinct hiv[illegible] united in autumn, they are found to con[illegible] together scarcely more honey during winter than each of [illegible] would have [illegible]sumed singly, if left separate. In proo

Having thus given a cursory description of the insect, individually considered, and of the habitation it forms, we next come to its social habits and institutions; and, in considering this little animal attentively, after the necessary precautions for the immediate preservation of the community, its second care is turned to the continuance of posterity. How numerous soever the multitude of bees may appear in one swarm, yet they all owe their original to a single parent, which is called the queen-bee. It is, indeed, surprising, that a single insect shall, in one summer, give birth to above twenty thousand young: but, upon opening her body, the wonder will cease; as the number of eggs appearing, at one time, amounts to five thousand. This animal, whose existence is of such importance to her subjects, may easily be distinguished from the rest by her size, and the shape of her body. On her safety depends the whole welfare of the commonwealth; and the attentions paid her by all the rest of the swarm, evidently show the dependence her subjects have upon her security. If this insect be carefully observed, she will be seen at times attended with a numerous retinue, marching from cell to cell, plunging the extremity of her body into many of them, and leaving a small egg in each.



(Wax-workers secreting wax.)

The bees which generally compose her train, are thought to be males, which serve to impregnate her by turns. These are larger and blacker than the common bees; without stings, and without industry. They seemed formed only to transmit a posterity; and to attend the queen, whenever she thinks proper to issue from the secret retreats of the hive, where she most usually resides. Upon the union of these two kinds depends all expectations of a future progeny; for the working bees are of no sex, and only labour for another offspring: yet such is their attention to their queen, that if she happens to die, they will leave off working, and take no farther care of posterity. If, however, another queen is in this state of universal despair presented them, they immediately acknowledge her for sovereign, and once more diligently apply to their labour. It must be observed, however, that all this fertility of the queen-bee, and the great attentions paid to her by the rest, are controverted by more recent observers. They assert, that the common bees are parents themselves; that they deposit their eggs in the cells which they have prepared; that the female are impregnated by the males, and bring forth a progeny, which is wholly their own.

However, to go on with their history, as delivered us by M. Réaumur—When the queen-bee has deposited the number of eggs necessary in the cells, the working bees undertake the care of the rising posterity. They are seen to leave off their usual employments; to construct proper receptacles for eggs; or to complete those that are already formed. They purposely build little cells, extremely solid, for the young; in which they employ a great deal of wax:

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is remarkable result, the author states a variety of experiments to which he had recourse, and all of which led uniformly to the same conclusion. And, indeed, he shows positively, by a reference to upwards of thirty hives, six of which had their population thus doubled, that the latter do not consume more provisions during winter than a single hive does; and that, so far from the bees suffering from this, the double hives generally send forth the earliest and best swarms.—The Bee Preserver.

those designed for lodging the males, as was already observed, are larger than the rest; and those for the queen-bees the largest of all. There is usually but one egg deposited in every cell; but when the fecundity of the queen is such that it exceeds the number of cells already prepared, there are sometimes three or four eggs crowded together in the same apartment. But this is an inconvenience that the working bees will by no means suffer. They seem sensible that, two young ones, stuffed up in the same cell, when they grow larger, will but embarrass, and at last destroy each other: they, therefore, take care to leave a cell to every egg, and remove, or destroy the rest.

The single egg that is left remaining, is fixed to the bottom of the cell, and touches it but in a single point. A day or two after it is deposited, the worm is excluded from the shell of the egg, having the appearance of a maggot rolled up in a ring, and lying softly on a bed of a whitish coloured jelly; upon which, also, the little animal begins to feed. In the mean time, the instant it appears, the working bees attend it with the most anxious and parental tenderness; they furnish it every hour with a supply of this whitish substance, on which it feeds and lies; and watch the cell with unremitting care. They are nurses that have a greater affection for the offspring of others, than many parents have for their own children. They are constant in visiting each cell, and seeing that nothing is wanting; preparing the white mixture, which is nothing but a composition of honey and wax, in their own bowels, with which they feed them. Thus attended, and plentifully fed, the worm, in less than six days' time, comes to its full growth, and no longer accepts the food offered it. When the bees perceive that it has no further occasion for feeding, they perform the last offices of tenderness, and shut the little animal up in its cell; walling up the mouth of its apartment with wax: there they leave the worm to itself; having secured it from every external injury.

The worm is no sooner left inclosed, but, from a state of inaction, it begins to labour, extending and shortening its body; and by this means lining the walls of its apartment with a silken tapestry, which it spins in the manner of caterpillars, before they undergo their last transformation. When their cell is thus prepared, the animal is soon after transformed into an aurelia; but differing from that of the common caterpillar, as it exhibits not only the legs, but the wings of the future bee, in its present state of inactivity. Thus, in about twenty, or one-and-twenty days after the egg was laid, the bee is completely formed, and fitted to undergo the fatigues of its state. When all its parts have acquired their proper strength and consistence, the young animal opens its prison, by piercing with its teeth the waxen door that confines it. When just freed from its cell, it is as yet moist, and incommoded with the spoils of its former situation; but the officious bees are soon seen to flock round it, and to lick it clean on all sides with their trunks; while another band, with equal assiduity, are observed to feed it with honey: others, again, begin immediately to cleanse the cell that has been just left; to carry the ordures out of the hive, and to fit the place for a new inhabitant. The young bee soon repays their care, by its industry; for as soon as ever its external parts become dry, it discovers its natural appetites for labour, and industriously begins the task, which it pursues unremittingly through life. The toil of man is irksome to him, and he earns his subsistence with pain; but this little animal seems happy in its pursuits, and finds delight in all its employments.

When just freed from the cell, and properly equipped by its fellow-bees for duty, it at once issues from the hive, and, instructed only by nature, goes in quest of flowers, chooses only those that yeld it a supply, rejects such as are barren of honey, or have been already drained by other adventurers; and when loaded, is never at a loss to find its way back to the common habitation. After this first sally, it begins to gather the mealy powder that lies on every flower, which is afterwards converted into wax; and with this, the very first day, it returns with two large balls stuck to its thighs.

When bees first begin to break their prisons, there are generally above a hundred excluded in one day. Thus, in the space of a few weeks, the number of the inhabitants in one hive, of moderate size, becomes so great, that there is no place to contain the new comers; and they are scarcely excluded from the cell, when they are obliged, by the old bees, to sally forth in quest of new habitations. In other words, the hive begins to swarm, and the new progeny prepares for exile.

While there is room enough in the hive, the bees remain quietly together; it is necessity alone that compels the separation. Sometimes, indeed, the young brood, with graceless obstinacy, refuse to depart, and even venture to resist their progenitors. The young ones are known by being browner than the old, with whiter hair; the old ones are of a lighter colour, with red hair. The two armies are, therefore, easily distinguishable, and dreadful battles are often seen to ensue. But the victory almost ever terminates, with strict poetical justice, in favour of the veterans, and the rebellious offspring are driven off, not without loss and mutilation.

In different countries, the swarms make their appearance at different times of the year, and there are several signs previous to this intended migration. The night before, an unusual buzzing is heard in the hive; in the morning, though the weather be soft and inviting, they seem not to obey the call, being intent on more important meditations within. All labour is discontinued in the hive, every bee is either employed in forcing, or reluctantly yielding a submission; at length, after some noise and tumult, a queen-bee is chosen, to guard, rather than conduct, the young colony to other habitations, and then they are marshalled without any apparent conductor. In less than a minute, they leave their native abode, and forming a cloud round their protectress, they set off, without seeming to know the place of their destination; *the world before them, where to choose their place of rest.**

When the swarm is thus conducted to a place of rest, and the policy of government is settled, the bees soon resume their former labours The making cells, storing them with honey, impregnating the queen, making proper cells for the reception of the rising progeny, and protecting them from external danger, employ their unceasing industry. But soon after, and towards the latter end of summer, when the colony is sufficiently stored with inhabitants, a most cruel policy ensues. The drone bees, which are (as has been said) generally in a hive to the number of a hundred, are marked for slaughter. These, which had hitherto led a life of indolence and pleasure, whose only employment was in impregnating the queen, and rioting upon the labours of the hive, without aiding in the general toil, now share the fate of most voluptuaries, and fall a sacrifice to the general resentment of society.

The working bees, in a body, declare war against them; and in two or three days' time, the ground all round the hive is covered with their dead bodies. Nay, the working bees will even kill such drones as are yet in the worm state in the cell, and eject their bodies from the hive, among the general carnage.

When a hive sends out several swarms in the year, the first is always the best, and the most numerous. These having the whole summer before them, have the more time for making wax and honey, and consequently their labours are the most valuable to the proprietor. Although the swarm chiefly consists of the youngest bees, yet it is often found, that bees of all ages compose the multitude of emigrants, and it often happens, that bees of all ages are seen remaining behind. The number of them is always more considerable than that of some populous cities, for sometimes upwards of forty thousand are found in a single hive. So large a body may well be supposed to work with great expedition; and, in fact, in less than twenty-four hours, they will make combs above twenty inches long, and seven or eight broad. Sometimes they will half fill their hives with wax in less than five days. In the first fifteen days, they are always found to make more wax than they do afterwards during the rest of the year.

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* SWARMING OF BEES.—An interesting communication was read, at a recent sitting of the Royal Society, from T. A. Knight, Esq., describing the precaution taken by a swarm of bees, in reconnoitering the situation where they intend to establish their new colony, or swarm, from the parent hive. The bees do not go out in a considerable body, but they succeed each other in going and returning, until the whole of the swarm have apparently made good the survey, after which the whole body take their departure in a mass. If by any chance a large portion of a swarm take their departure without the queen-bee, they never proceed to take up the ulterior quarters without her majesty's presence. The result of Mr. Knight's observations tends to prove, that all the operations of a swarm of bees are dictated by previous concert, and the most systematic arrangement.—ARCANA OF SCIENCE, 1829.

Such are the outlines of the natural history of these animals, as usually found in our own country. How they are treated, so as to produce the greatest quantity of honey, belongs rather to the rural economist than the natural historian; volumes have been written on the subject, and still more remains equally curious and new. One thing, however, it may be proper to observe, that a farm, or a country, may be over-stocked with bees, as with any other sort of animal; for a certain number of hives always require a certain number of flowers to subsist on. When the flowers near home are rifled, then are these industrious insects seen taking more extensive ranges; but their abilities may be over-taxed; and if they are obliged, in quest of honey, to go too far from home, they are over-wearied in the pursuit, they are devoured by birds, or beat down by the winds and rain.

From a knowledge of this, in some parts of France and Piedmont, they have contrived, as I have often seen, a kind of floating bee-house.

They have on board one barge, threescore or a hundred bee-hives, well defended from the inclemency of an accidental storm; and with these, the owners suffer themselves to float gently down the river. As the bees are continually choosing their flowery pasture along the banks of the stream, they are furnished with sweets before unrifled; and thus a single floating bee-house yields the proprietor a considerable income. Why a method similar to this has never been adopted in England, where we have more gentle rivers, and more flowery banks, than in any other part of the world, I know not; certainly it might be turned to advantage, and yield the possessor a secure, though, perhaps, a moderate income.

Having mentioned the industry of these admirable insects, it will be proper to say something of the effects of their labour, of that wax and honey, which are turned by man to such various uses. Bees gather two kinds of wax, one coarse and the other fine. The coarser sort is bitter, and with this, which is called *propolis*, they stop up all the holes and crevices of their hives. It is of a more resinous nature than the fine wax, and is consequently better qualified to resist the moisture of the season, and preserve the works warm and dry within. The fine wax is as necessary to the animal's preservation as the honey itself. With this they make their lodgings, with this they cover the cells of their young, and in this they lay up their magazines of honey. This is made, as has been already observed, from the dust of flowers, which is carefully kneaded by the little insect, then swallowed, and having undergone a kind of digestion, is formed into the cells, which answers such a variety of purposes. To collect this, the animal rolls itself in the flower it would rob, and thus takes up the vegetable dust with the hair of its body. Then carefully brushing it into a lump, with its fore paws it thrusts the composition into two cavities behind the thighs, which are made like spoons to receive the wax, and the hair that lines them, serves to keep it from falling.*

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* FECUNDATION OF FLOWERS.—Formerly the fecundation of flowers, in which the sexes are separated, was almost wholly attributed to the wind. Kohlreuter and Sprengel have proved, with astonishing sagacity, that bees, wasps, and a great number of small winged insects, perform the principal part in this operation. I say the principal part; for to assert that the fecundation of the germen absolutely cannot take place without the intervention of these little animals, does not seem to me in conformity with the genus of nature, as Wildenow has demonstrated at length. But, on the other hand, it must be observed, that dichogamy, the coloured spots of the petals, which indicate the vessels in which the honey is contained, and fecundation by the contact of insects, are three circumstances almost inseparable.—HUMBOLDT.

As of wax, there are also two kinds of honey: the white and the yellow. The white is taken without fire from the honey-combs. The yellow is extracted by heat, and squeezed through bags, in a press. The best honey is new, thick, and granulated, of a clear, transparent, white colour, of a soft and aromatic smell, and of a sweet, lively taste. Honey made in mountainous countries, is preferable to that of the valley. The honey made in the spring, is more highly esteemed than that gathered in summer, which last is still more valuable than that of autumn, when the flowers begin to fade and lose their fragrance.

The bees are nearly alike in all parts of the world, yet there are differences worthy our notice. In Guadaloupe, the bee is less, by one-half, than the European, and more black and round. They have no sting, and make their cells in hollow trees; where, if the hole they meet with is too large, they form a sort of waxen house, of the shape of a pear, and in this they lodge and store their honey, and lay their eggs. They lay up their honey in waxen vessels, of the size of a pigeon's egg, of a black or deep violet colour; and these are so joined together, that there is no space left between them. The honey never congeals, but is fluid, of the consistence of oil, and the colour of amber. Resembling these, there are found little black bees, without a sting, in all the tropical climates; and though these countries are replete with bees, like our own, yet those form the most useful and laborious tribe in that part of the world. The honey they produce is neither so unpalatable, nor so surfeiting as ours; and the wax is so soft, that it is only used for medicinal purposes, it being never found hard enough to form into candles, as in Europe.*

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* WILD-HONEY BEES.—The architecture of the hive, which we have thus detailed, is that of bees receiving the aid of human care, and having external coverings of a convenient form, prepared for their reception. In this country bees are not found in a wild state; though it is not uncommon for swarms to stray from their proprietors. But these stray swarms do not spread colonies through our woods, as they are said to do in America. In the remoter parts of that continent there are no wild bees. They precede civilization; and thus, when the Indians observe a swarm, they say, "the white man is coming." There is evidence of bees having abounded in these islands, in the earlier periods of our history; and Ireland is particularly mentioned by the Venerable Bede as being "rich in milk and honey." The hive-bee has formed an object of economical culture in Europe at least for two thousand years; and Varro describes the sort of hives used in his time, 1870 years ago. We are not aware, however, that it is now to be found wild in the milder clime of Southern Europe, any more than it is in our own island.

The wild bees of Palestine principally hived in rocks. "He made him," says Moses, "to suck honey out of the rock." 'With honey out of the rock," says the Psalmist, "should I have satisfied thee." In the caves of Salsette and Elephanta, at the present day, they hive in the clefts of the rocks, and the recesses among the fissures' in such numbers, as to become very troublesome to visiters. Their nests hang in innumerable clusters.

We are told of a little, black, stingless bee found in the island of Guadaloupe, which hives in hollow trees, or in the cavities of rocks by the sea-side, and lays "up honey in cells about the size and shape of pigeons' eggs. These cells are of a black or deep violet colour, and so joined together as to leave no space between them. They hang in clusters almost like a bunch of grapes." The following are mentioned by Lindley as indigenous to Brazil. "On an excursion towards Upper Tapagippe," says he, "and skirting the dreary woods which extend to the interior, I observed the trees more loaded with bees' nests, than even in the neighbourhood of Porto Seguro. They consist of a ponderous shell of clay cemented similarly to martins' nests, swelling from high trees about a foot thick, and forming an oval mass full two feet in diameter. When broken, the wax is arranged as in our hives, and the honey abundant."

Captain Basil Hall found in South America the hive of a honey-bee very different from the Brazilian, but nearly allied to, if not the same, as that of Guadaloupe. "The hive we saw opened," he says, "was only partly filled, which enabled us to see the economy of the interior to more advantage. The honey is not contained in the elegant hexagonal cells of our hives, but in wax-bags, not quite so large as an egg. These bags, or bladders, are hung round the sides of the hive, and appear about half full; the quantity being probably just as great as the strength of the wax will bear without tearing. Those near the bottom, being better supported, are more filled than the upper ones. In the centre of the lower part of the hive

CHAP. III.

THE WASP.

However similar many insects may be in appearance, this does not imply a similitude in their history. The bee and the wasp resemble each other very strongly, yet, in examining their manner and their duration, they differ very widely: the bee labours to lay up honey, and lives to enjoy the fruits of its in-

we observed an irregularly-shaped mass of comb, furnished with cells like those of our bees, all containing young ones in such an advanced state, that, when we broke the comb, and let them out, they flew merrily away."

Clavigero, in his History of Mexico, evidently describing the same species of bee, says it abounds in Yucatan, and makes the honey of Estabentum, the finest in the world, and which is taken every two months. He mentioned another species of bee, smaller in size, and also without a sting, which forms its nest of the shape of a sugarloaf, and as large or larger. These are suspended from trees, particularly from the oak, and are much more populous than our common hives.

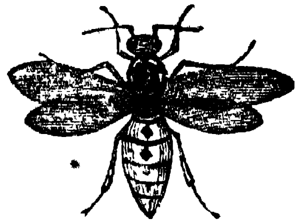
Wild honey-bees of some species appear also to abound in Africa. Mr. Park, in his second volume of travels, tells us that some of his associates imprudently attempted to rob a numerous hive of its honey, when the exasperated bees, rushing out to defend their property, attacked their assailants with great fury, and quickly compelled the whole company to fly.

At the Cape of Good Hope, the bees themselves must be less formidable, or more easily managed, as their hives are sought for with avidity. Nature has there provided man with a singular and very efficient assistant in a bird, most appropriately named the Honey-guide (*Indicator major*, Vieillot; *Cuculus indicator*, Latham). The honey-guide, so far from being alarmed at the presence of man, appears anxious to court his acquaintance, and flits from tree to tree with an expressive note of invitation, the meaning of which is well known both to the colonists and the Hottentots. A person invited by the honey-guide seldom refuses to follow it onwards till it stops, as it is certain to do, at some hollow tree containing a bee-hive, usually well stored with honey and wax. It is probable that the bird finds itself inadequate to the attack of a legion of bees, or to penetrate into the interior of the hive, and is thence led to invite an agent more powerful than itself. The person invited, indeed, always leaves the bird a share of the spoil, as it would be considered sacrilege to rob it of its due, or in any way to injure so useful a creature.

The Americans, who have not the African honey-guide, employ several well-known methods to track bees to their hives. One of the most common, though ingenious modes, is to place a piece of bee-bread on a flat surface, a tile for instance, surrounding it with a circle of wet white paint. The bee, whose habit it is always to alight on the edge of any plane, has to travel through the paint to reach the bee-bread. When, therefore, she flies off, the observer can track her by the white on her body. The same operation is repeated at another place, at some distance from the first, and at right angles to the bee-line, just ascertained. The position of the hive is easily determined, for it lies in the angle made by the intersection of the bee-lines. Another method is described in the Philosophical Transactions for 1721. The bee-hunter decoys, by a bait of honey, some of the bees into his trap, and when he has secured as many as he judges will suit his purpose, he incloses one in a tube, and, letting it fly, marks its course by a pocket compass. Departing to some distance, he liberates another, observes its course, and in this manner determines the position of the hive, upon the principle already detailed. These methods of bee-hunting depend upon the insect's habit of always flying in a right line to its home. Those who have read Cooper's tale of the "Prairie," must well remember the expression of "lining a bee to its hive."

In reading these and similar accounts of the bees of distant parts of the world, we must not conclude that the descriptions refer to the same species as the common honey-bee. There are numerous species of social bees, which, while they differ in many circumstances, agree in the practice of storing up honey, in the same way as we have numerous species of the mason-bee and of the humble bee. Of the latter, Mr. Stephens enumerates no less than forty-two species indigenous to Britain.—Insect Architec.

dustry; the wasp appears equally assiduous, but only works for posterity, as the habitation is scarcely completed when the inhabitant dies.


(The Wasp)

The wasp is well known to be a winged insect with a sting. To be longer, in proportion to its bulk, than the bee; to be marked with bright yellow circles round its body; and to be the most swift and active insect of all the fly kind. On each side of the mouth this animal is furnished with a long tooth, notched like a saw, and with these it is enabled to cut any substance, not omitting meat itself, and to carry it to its nest. Wasps live like bees in community, and sometimes ten or twelve thousand are found inhabiting a single nest.

Of all other insects, the wasp is the most fierce, voracious, and most dangerous, when enraged. They are seen wherever flesh is cutting up, gorging themselves with the spoil, and then flying to their nests with their reeking prey. They make war also on every other fly, and the spider himself dreads their approaches.

Every community among bees is composed of females or queens, drones or males, and neutral or working bees. Wasps have similar occupations; the two first are for propagating the species, the last for nursing, defending, and supporting the rising progeny. Among bees, however, there is seldom above a queen or two in a hive; among wasps there are above two or three hundred.

As soon as the summer begins to invigorate the insect tribes, the wasps are the most of the number, and diligently employed either in providing provisions for their nest, if already made, or in making one, if the former habitation be too small to receive the increasing community. The nest is one of the most curious objects in natural history, and contrived almost as artificially as that of the bees themselves. Their principal care is to seek out a hole that has been begun by some other animal, a field mouse, a rat, or a mole, to build their nests in. They sometimes build upon the plain, where they are sure of the dryness of their situation, but most commonly on the side of a bank, to avoid the rain or water that would otherwise annoy them. When they have chosen a proper place, they go to work with wonderful assiduity. Their first labour is to enlarge and widen the hole, taking away the earth and carrying it off to some distance. They are perfectly formed for labour, being furnished with a trunk above their mouths, two saws on each side which play to the right and left against each other, and six, strong, muscular legs to support them. They cut the earth into small parcels with their saws, and carry it out with their legs or paws. This is the work of some days; and at length the outline of their habitation is formed, making a cavity of about a foot and a half every way. While some are working in this manner, others are roving the fields to seek out materials for their building. To prevent the earth from falling down and crushing their rising city into ruin, they make a sort of roof with their gluey substance, to which they begin to fix the rudiments of their building, working from the top downwards, as if they were hanging a bell, which, however, at length they close up at the bottom. The materials with which they build their nests, are bits of wood and glue. The wood they get where they can from the rails and posts which they meet with in the fields and elsewhere. These they saw and divide into a multitude of small fibres, of which they take up little bundles in their claws, letting fall upon them a few drops of gluey matter with which their bodies are provided, by the help of which they knead the whole composition into a paste, which serves them in their future building. When they have returned with this to the nest, they stick their load of paste on that part where they make their walls and partitions; they tread it close with their feet, and trowel it with their trunks, still going backwards as they work. Having repeated this operation three or four times, the composition is at length flatted out until it becomes a small leaf of a grey colour, much finer than paper, and of a pretty firm texture.* This done, the same wasp returns to the field to collect a second load of paste, repeating the same several times, placing layer upon layer, and strengthening every partition in proportion to the wants or convenience of the general fabric. Other working wasps come

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* The Wasp a Paper-maker.—The wasp is a paper-maker, and a most perfect and intelligent one. While mankind were arriving by slow degrees, at the art of fabricating this

valuable substance, the wasp was making it before their eyes, by very much the same process as that by which human hands now manufacture it with the best aid of chemistry and machinery. While some nations carved their records on wood, and stone, and brass, and leaden tablets,—others, more advanced, wrote with a style on wax,—others employed the inner bark of trees, and others the skins of animals rudely prepared,—the wasp was manufacturing a firm and durable paper. Even when the papyrus was rendered more fit, by a process of art, for the transmission of ideas in writing, the wasp was a better artisan than the Egyptians; for the early attempts at paper-making were so rude, that the substance produced was almost useless, from being extremely friable. The paper of the papyrus was formed of the leaves of the plant, dried, pressed, and polished; the wasp alone knew how to reduce vegetable fibres to a pulp, and then unite them by a size or glue, spreading the substance out into a smooth and delicate leaf. This is exactly the process of paper-making. It would seem that the wasp knows, as the modern paper-makers now know, that the fibres of rags, whether linen or cotton, are not the only materials that can be used in the formation of paper, she employs other vegetable matters, converting them into a proper consistency by her assiduous exertions. In some respects she is more skilful even than our paper-makers, for she takes care to retain her fibres of sufficient length, by which she renders her paper as strong as she requires. Many manufacturers of the present day cut their material into small bits, and thus produce a rotten article. One great distinction between good and bad paper is its toughness; and this difference is invariably produced by the fibre of which it is composed being long, and therefore tough; or short, and therefore friable.

The wasp has been labouring at her manufacture of paper, from her first creation, with precisely the same instruments and the same materials; and her success has been unvarying. Her machinery is very simple, and therefore it is never out of order. She learns nothing, and she forgets nothing. Men, from time to time, lose their excellence in particular arts, and they are slow in finding out real improvements. Such improvements are often the effect of accident. Paper is now manufactured very extensively by machinery, in all its stages; and thus, instead of a single sheet being made by hand, a stream of paper is poured out, which would form a roll large enough to extend round the globe, if such a length were desirable. The inventors of this machinery, Messrs. Fourdrinier, it is said, spent the enormous sum of 40,000*l.* in vain attempts to render the machine capable of determining with precision the width of the roll; and, at last, accomplished their object, at the suggestion of a bystander, by a strap revolving upon an axis at a cost of three shillings and sixpence. Such is the difference between the workings of human knowledge and experience, and those of animal instinct. We proceed slowly and in the dark—but our course is not bounded by a narrow line, for it seems difficult to say what is the perfection of any art; animals go clearly to a given point—but they can go no further. We may, however, learn something from their perfect knowledge of what is within their range. It is not improbable that if man had attended in an earlier state of society to the labours of wasps, he would have sooner known how to make paper. We are still behind in our arts and sciences, because we have not always been observers. If we had watched the operations of insects, and the structure of animals in general, with more care, we might have been far advanced in the knowledge of many arts, which are yet in their infancy, for nature has given us abundance of patterns. We have learnt to perfect some instruments of sound, by examining the structure of the human ear; and the mechanism of an eye has suggested some valuable improvements in achromatic glasses.—INSECT MANUFACTURE.

INSECT MANUFACTURERS.—A most extraordinary species of manufacture, which is in a slight degree connected with copying, has been contrived by an officer of engineers residing at Munich. It consists of lace and veils, with open patterns in them, made entirely by caterpillars. The following is the mode of proceeding adopted:—Having made a paste of the leaves of the plant on which the species of caterpillar he employs feeds, he spreads it thinly over a stone, or other flat substance, of the required size. He then, with a camel-hair pencil, dipped in olive-oil, draws the pattern he wishes the insects to leave open. This stone is then placed in an inclined position, and a considerable number of caterpillars placed at the bottom. A peculiar species is chosen which spins a strong web; and the animals commence at the bottom eating and spinning their way up to the top, carefully avoiding every part touched with oil, but devouring every other part of the paste. The extreme lightness of these veils, combined with some strength, is truly surprising. One of them, measuring twenty-six and a half inches by seventeen inches, quickly after to repeat the same operation, laying more leaves upon the former, till at length, after much toil, they have finished the large roof which is to secure them from the tumbling in of the earth. This dome being finished, they make another entrance to their habitation, designed either for letting in the warmth of the sun, or for escaping in case one door be invaded by plunderers. Certain, however, it is, that by one of these they always enter, by the other they sally forth to their toil, each hole being so small that they can pass but one at a time. The walls being thus composed, and the whole somewhat of the shape of a pear, they labour at their cells which they compose of the same paper like substance that goes to the formation of the outside works. Their combs differ from those of bees, not less in the composition than the position which they are always seen to obtain. The honey-comb of the bee is edgeways with respect to the hive, that of the wasp is flat, and the mouth of every cell opens downwards. Thus is their habitation, contrived story above story, supported by several rows of pillars, which give firmness to the whole building, while the upper story is flat-roofed, and as smooth as the pavement of a room, laid with squares of marble. The wasps can freely walk upon these stories between the pillars to do whatever their wants require. The pillars are very hard and compact, being larger at each end than in the middle, not much unlike the columns of a building. All the cells of the nest are only destined for the reception of the young, being replete with neither wax nor honey.

Each cell is like that of the bee, hexagonal; but they are of two sorts, the one larger for the production of the male and female wasps, the other less for the reception of the working part of the community. When the females are impregnated by the males, they lay their eggs, one in each cell, and stick it in with a kind of gummy matter to prevent its falling out. From this egg proceeds the insect in its worm state, of which the old ones are extremely careful, feeding it from time to time till it becomes large and entirely fills up its cell. But the wasp community differs from that of the bee in this: that among the latter, the working bees take the parental duties upon them; whereas, among the wasps, the females alone are permitted to feed their young, and to nurse their rising progeny. For this purpose the female waits with great patience till the working wasps have brought in their provisions, which she takes from them, and cuts into pieces. She then goes with great composure from cell to cell, and feeds every young one with her mouth. When the young worms have come to a certain size, they leave off eating, and begin to spin a very fine silk, fixing the first end to the entrance of the cell, then turning their heads first on one side, then on the other, they fix the thread to different parts, and thus they make a sort of door which serves to close up the mouth of the cell. After this they divest themselves of their skins after the usual mode of transformation, the aurelia by degrees begins to emancipate itself from its shell; by little and little it thrusts out its legs and wings, and insensibly acquires the colour and shape of its parent.

The wasp thus formed, and prepared for depredation, becomes a bold, troublesome, and dangerous insect: there are no dangers which it will not encounter in pursuit of its prey, and nothing seems to satiate its gluttony. Though it can gather no honey of its own, no animal is more fond of sweets. For this purpose it will pursue the bee and the humble-bee, destroy them with its sting, and then plunder them of their honey-bags, with which it flies triumphantly loaded to its nest to regale its young. Wasps are ever fond of making their nests in the neighbourhood of bees, merely to have an opportunity of robbing their hives, and feasting on the spoil. Yet the bees are not found always patiently submissive to their tyranny, but fierce battles are sometimes seen to ensue, in which the bees make up by conduct and numbers what they want in personal prowess.

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weighed only 1.51 grains, a degree of lightness which will appear more strongly by contrast with other fabrics. One square yard of the substance of which these veils are made weighs four grains and one third, whilst one square yard of silk gauze weighs one hundred and thirty-seven grains, and one square yard of the finest patent net weighs two hundred and sixty-two grains and a half. —BABBAGE'S ECONOMY OF MANUFACTURES.

When there is no honey to be had, they seek for the best and sweetest fruits, and they are never mistaken in their choice. From the garden they fly to the city, to the grocers' shops and butchers' shambles.

While the summer heats continue, they are bold, voracious, and enterprising; but as the sun withdraws, it seems to rob them of their courage and activity. In proportion as the cold increases, they are seen to become more domestic; they seldom leave the nest, they make but short adventures from home, they flutter about in the noon-day heats, and soon after return chilled and feeble.*

As their calamities increase, new passions soon begin to take place; the care for posterity no longer continues, and as the parents are no longer able to provide their growing progeny a supply, they take the barbarous resolution of sacrificing them all to the necessity of the times. In this manner, like a garrison upon short allowance, all the useless hands are destroyed; the young worms, which a little before they fed and protected with so much assiduity, are now butchered and dragged from their cells. As the cold increases they no longer find sufficient warmth in their nests, which grow hateful to them, and they fly to seek it in the corners of houses, and places that receive an artificial heat. But the winter is still insupportable, and before the new year begins they wither and die; the working wasps first, the males soon following, and many of the females suffering in the general calamity. In every nest, however, one or two females survive the winter, and having been impregnated by the male during the preceding season, she begins in spring to lay her eggs in a little hole of her own contrivance. These soon after become breeders in turn, till, from a single female, ten thousand wasps are seen produced before the month of June. After the female has thus produced her progeny, which are distributed in different districts, they assemble from all parts, in the middle of summer, and provide for themselves the large and commodious habitation, which has been described above.

Such is the history of the social wasp; but, as among bees, so also among these insects, there are various tribes that live in solitude: these lay their eggs in a hole for the purpose, and the parent dies long before the birth of its offspring. In the principal species of the solitary wasps, the insect is smaller than the working wasp of the social kind. The filament by which the corselet is joined to the body is longer and more distinctly seen, and the whole colour of the insect is blacker than in the ordinary kinds. But it is not their figure, but the manners of this extraordinary insect that claim our principal regard.

From the end of May to the beginning of July, this wasp is seen most diligently employed. The whole purpose of its life seems to be in contriving and fitting-up a commodious apartment for its young one, which is not to succeed it till the year ensuing. For this end it is employed, with unwearied assiduity, in boring a hole into the finest earth some inches deep, but not much wider than the diameter of its own body. This is but a gallery leading to a wider apartment destined for the convenient lodgment of its young. As it always chooses a gravelly soil to work in, and where the earth is almost as hard as stone itself the digging and hollowing this apartment is an enterprise of no small labour. For effecting its operations, this insect is furnished with two teeth, which are strong and firm, but not sufficiently hard to penetrate the substance through which it is resolved to make its way: in order, therefore, to soften that earth which it is unable to pierce, it is furnished with a gummy liquor, which it emits upon the place, and which renders it more easily separable from the rest, and the whole, becoming a kind of soft paste, is removed to the mouth of the habitation. The animal's provision of liquor in these operations is, however, soon exhausted; and it is then seen either taking up water from some neighbouring flower or stream in order to supply the deficiency.

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* PROVISION OF NATURE.—There is a wonderful provision in the economy of nature, by which the numbers of these troublesome marauders are kept within moderate bounds, and but for which they would soon overrun the face of the earth. Every wasp's nest is peopled by several thousands of neuters, or workers. But the neuters, which are first produced, are likewise the first that perish: for not one of them survives the termination of even a mild winter.

The female wasps are, however, stronger, and can bear the rigours of winter better than either the males or neuters. But several hundreds of the females of every nest perish before the end of the winter, and, indeed, not more than ten or a dozen of each nest survive that season. These females are destined for the continuation of the species, and each of them becomes the founder of a new republic. It is quite uncertain whether any male wasps survive. Every nest, about the beginning of October, presents a strange scene of what appears anomalous cruelty. The wasps then not only desist from bringing nourishment to their young, but also drag them in the caterpillar state from their cells, and expose them to the weather, where they either die for want of food, or become a prey to birds, or, as is more generally the case, the parent wasps pinch them to death with their forceps. But instead of being cruel and unnatural, this is perhaps an act of mercy, as wasps do not lay up a store of food for the winter, and their progeny would consequently die a painful and lingering death from starvation if left in their cells. So that what appears a transgression of the predominating love of animals for their young is, in fact, a merciful effort of instinct.—NOTE TO NAT. HIST. OF SELBORNE.

At length, after much toil, a hole some inches deep is formed, at the bottom of which is a large cavity; and to this no other hostile insect would venture to find its way, from the length and the narrowness of the defile through which it would be obliged to pass. In this the solitary wasp lays its egg, which is destined to continue the species; there the nascent animal is to continue for above nine months, unattended and immured, and at first appearance the most helpless insect of the creation. But when we come to examine, new wonders offer: no other insect can boast so copiously luxurious a provision, or such confirmed security.

As soon as the mother wasp has deposited her egg at the bottom of the hole, her next care is to furnish it with a supply of provisions, which may be offered to the young insect as soon as it leaves the egg. To this end she procures a number of little green worms, generally from eight to twelve, and these are to serve as food for the young one the instant it awakens into life. When this supply is regularly arranged and laid in, the old one then, with as much assiduity as it before worked out its hole, now closes the mouth of the passage; and thus leaving its young one immured in perfect security and in a copious supply of animal food, she dies, satisfied with having provided for a future progeny.

When the young one leaves the egg it is scarcely visible, and is seen immured among a number of insects, infinitely larger than itself, ranged in proper order around it, which, however, give it no manner of apprehension. Whether the parent, when she laid in the insect provision, contrived to disable the worms from resistance, or whether they were at first incapable of any, is not known. Certain it is, that the young glutton feasts upon the living spoil without any control; his game lies at his hand, and he devours one after the other as the calls of appetite incite him. The life of the young animal is therefore spent in the most luxurious manner, till its whole stock of worms is exhausted, and then the time of its transformation begins to approach; and then spinning a silken web, it continues fixed in its cell till the sun calls it from its dark abode the ensuing summer.

The wasps of Europe are very mischievous, yet they are innocence itself when compared to those of the tropical climates, where all the insect tribes are not only numerous, but large, voracious, and formidable.* Those of the West Indies are thicker, and twice as long as the common bee; they are of a grey

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* CAYENNE WASP.—Réaumur has given a very interesting account of the wasps of Cayenne, which hang their nests in trees. Like the bird of Africa, called the loxia, they fabricate a perfect house, capable of containing many hundreds of their community, and suspend it on high out of the reach of attack. But the Cayenne wasp is a more expert artist than the bird. He is a card-maker; and travellers of veracity agree that the card with which he forms the exterior covering of his abode is so smooth, so strong, so uniform in its texture, and so white, that the most skilful manufacturer of this substance might be proud of the work.

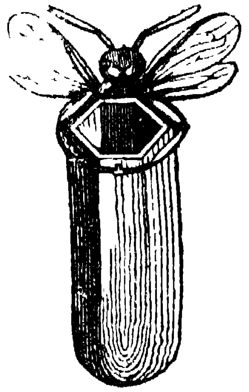
The nest of the card-making wasp is impervious to water. It hangs upon the branch of a tree; and those rain drops which penetrate through the leaves never rest upon its hard and polished surface. A small opening colour, striped with yellow, and armed with a very dangerous sting. They make their cells in the manner of a honey-comb, in which the young ones are hatched and bred. They generally hang their nests by threads, composed of the same substance with the cells, to the branches of trees, and the eaves of houses. They are seen every where in great abundance, descending like fruit, particularly pears, of which shape they are, and as large as one's head. The inside is divided into three round stories, full of cells, each hexagonal, like those of a honey-comb. In some of the islands, these insects are so very numerous, that their nests are stuck up in this manner, scarce two feet asunder, and the inhabitants are in continual apprehension from their accidental resentment. It sometimes happens, that no precautions can prevent their attacks, and the pains of their sting is almost insupportable. Those who have felt it think it more terrible than even that of a scorpion; the whole visage swells, and the features are so disfigured, that a person is scarcely known by his most intimate acquaintance.*

for the entrance of the insects terminates its funnel-shaped bottom. It is impossible to unite more perfectly the qualities of lightness and strength.—INSECT ARCHITECTURE.

*** BROWN HORNET OF NEW SOUTH WALES**—In No. 8 of *Jameson's Philosophical Journal*, are some interesting observations on the large brown hornet of New South Wales, which were read before the Wernerian Natural History Society, January 12th, 1828. This insect has a beautiful appearance in the living state, having a number of yellowish-brown segments, on a black ground, around his body; his legs and wings being of the same colour; a fine yellowish colour presents itself on each shoulder, at the root of the wings, and there is a yellow stripe on the forehead. The rest of the body is a beautiful velvet-black, and the tips of the wings are tinged with a light purple colour. It has six legs, the two first of which it uses with great dexterity as hands. They may be seen frequently rubbing them, and thrusting their foot into their mouth, to besmear it with an unctuous substance, which may enable it to seize a firmer hold of its object.

It is from the structure of the fore-legs, which are admirably adapted for the purpose, that, it is supposed the hexagonal cells derive their character of regularity. When the sun is hot, you may see the insect traversing round his cell, seizing the edge of it in his mouth, and adding a small piece to the sides. When he has done this, he sets his body close to a side, and clasping the cell firmly in his fore-arms, he continues rubbing it upwards and downwards for a considerable time; and as one cell is always a little higher than the one next it, he proceeds thus from side to side, and gives a six-sided form simply by rubbing and working upon the soft materials with its arms. A very little attention will show, too, that he can give it no other form than this or the circle. For his arms are so constructed, that if he acts uniformly upon any of these sides or angles, as we have repeatedly seen him do, he must form a hexagonal figure, if the materials are pliant.

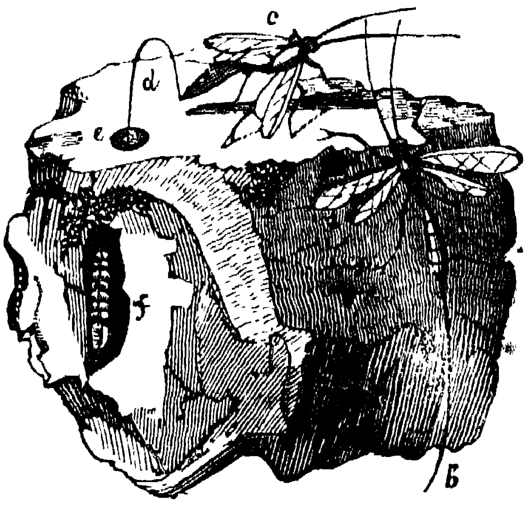
The arms are first composed of a joint near the body, extending a little outward, and movable in every direction. To this is attached the arm, which is smooth, and somewhat powerful. Next this is the fore-arm, and next it are the feet, which have three hooks, a small one on each side, and a larger in front. Between each of these is a powerful joint, and they are confined to a large angle, as they cannot be extended into a straight line. When the animal, therefore, has made the sides of his cell in a circular shape by the gluten from his mouth, and a quantity of pipe-clay, which he frequently employs in the building of it, he applies his body to it, and, placing the fore-arms around it, at an angle most convenient for itself, he continues to rub up and down till the shape has been given to the cell. The first angle is formed by the body and the arm; the second by the arm and fore-arm, and the third on each side by the angles formed by the fore-arm, and the feet or claws.



In proof of this, it may be remarked, that the bottom of the cells is round, and the hexagonal form does not commence till the cell has attained a sufficient height to admit of the application of the animal's body and legs to the outside of the cell, after which, to the top of the cell, the hexagonal form is remarkably distinct. Besides, to leave no doubt about the matter, we have measured the legs of a full-grown hornet, and then applied them to the sides of the cells, and out of 160 cells in one nest, found only half a dozen, near the outside, that did not correspond exactly with the length of the arm or fore-arm and these were probably injured or dried up.

CHAP. IV.

THE ICHNEUMON FLY.



(Ichneumon Flies.)

Every rank of insects, how voracious soever, have enemies that are terrible to them, and that revenge upon them the injuries done upon the rest of the animated creation. The wasp, as we have seen, is very troublesome to man, and very formidable to the insect tribe; but the ichneumon fly (of which there are many varieties) fears not the wasp itself; it enters its retreats, plunders its habitations, and takes possession of that cell for its own young, which the wasp had laboriously built for a dearer posterity

Though there are many different kinds of this insect, yet the most formidable, and that best known, is called the common ichneumon, with four wings, like the bee, a long, slender, black body, and a three-forked tail, consisting of bristles; the two outermost black, and the middlemost red. This fly receives its name from the little quadruped, which is found to be so destructive to the crocodile, as it bears a strong similitude in its courage and rapacity.

Though this instrument is, to all appearance, slender and feeble, yet it is found to be a weapon of great force and efficacy. There is scarce any substance which it will not pierce; and, indeed, it is seldom seen but employed in penetration. This is the weapon of defence; this is employed in destroying its prey; and, still more, by this the animal deposits her eggs wherever she thinks fit to lay them. As it is an instrument chiefly employed for this purpose, the male is unprovided with such a sting, while the female uses it with great force and dexterity, brandishing it, when caught, from side to side, and very often wounding those who thought they held her with the greatest security.

All the flies of this tribe are produced in the same manner, and owe their birth to the destruction of some other insect, within whose body they have been deposited, and upon whose vitals they have preyed, till they came to maturity. There is no insect whatever which they will not attack, in order to leave their fatal present in its body; the caterpillar, the gnat, and even the spider himself, so formidable to others, is often made the unwilling fosterer of this destructive progeny.

About the middle of summer, when other insects are found in great abundance, the ichneumon is seen flying busily about, and seeking proper objects upon whom to depose its progeny. As there are various kinds of this fly, so they seem to have various appetites.* Some are found to place their eggs within the

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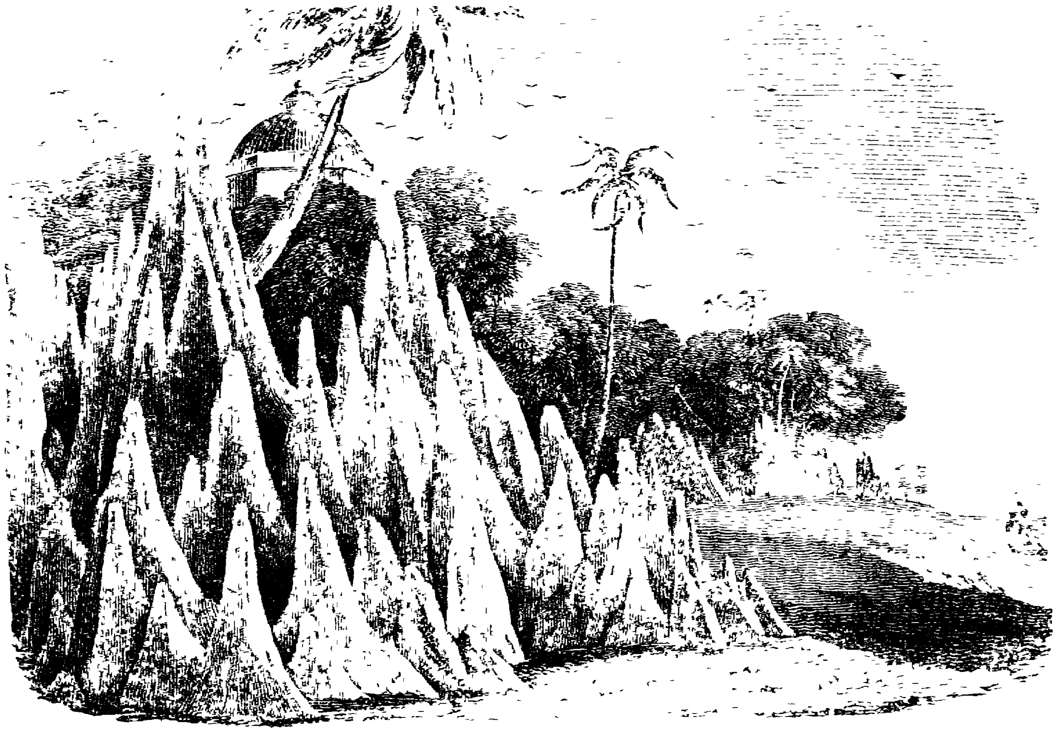
* Species of Ichneumon Fly.—There are several species of ichneumon which make thinnings among the caterpillars of the cabbage butterfly. The process of one species is this: while the caterpillar is feeding, the ichneumon fly hovers over it, and, with its piercer, perforates the fatty part of the caterpillar's back in many places, and in each deposits an egg, by means of the two parts of the sheath uniting together, and thus forming a tube, down which the egg is conveyed into the perforation made by the piercer of the fly. The caterpillar, unconscious of what will ensue, keeps feeding on, until it changes into



ANT HILLS

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aurelia of some nascent insect, others place them within the nest which the wasp had curiously contrived for its own young; and as both are produced at the same time, the young of the ichneumon not only devours the young wasp, but the whole supply of worms, which the parent had carefully provided for its provision. But the greatest number of the ichneumon tribe are seen settling upon the back of the caterpillar, and darting, at different intervals, their stings into its body. At every dart they deposit an egg, while the wounded animal seems scarcely sensible of the injury it sustains. In this manner they leave from six to a dozen of their eggs within the fatty substance of the reptile's body, and then fly off to commit farther depredations. In the meantime, the caterpillar, thus irreparably injured, seems to feed as voraciously as before; does not abate of its usual activity, and, to all appearance, seems no way affected by the internal enemies that are preparing its destruction in their darksome abode. But they soon burst from their egg state, and begin to prey upon the substance of their prison. As they grow larger, they require a greater supply, till at last the animal, by whose vitals they are supported, is no longer able to sustain them, but dies, its whole inside being almost eaten away. It often happens, however, that it survives their worm state, and then they change into a chrysalis, inclosed in the caterpillar's body till the time of their delivery approaches, when they burst their prisons and fly away. The caterpillar, however, is irreparably destroyed, it never changes into a chrysalis, but dies shortly after from the injuries it had sustained.

Such is the history of this fly, which, though very terrible to the insect tribe, fails not to be of infinite service to mankind. The millions which it kills in a single summer are inconceivable; and without such a destroyer, the fruits of the earth would only rise to furnish a banquet for the insect race, to the exclusion of all the nobler ranks of animated nature.

CHAP. V.

THE ANT.

Though the number of two-winged flies be very great, and the naturalists have taken some pains to describe their characters and varieties; yet there is such a similitude in their forms and manners, that, in a work like this, one description must serve for all. We now, therefore, come to a species of four-winged insects, that are famous from all antiquity for their social and industrious habits, that are marked for their spirit of subordination, that are offered as a pattern of parsimony to the profuse, and of unremitting diligence to the sluggard.

In the experiments, however, which have been more recently made, and the observations which have been taken, much of their boasted frugality and pre-

a chrysalis; while in that torpid state, the eggs of the ichneumon are hatched, and the interior of the body of the caterpillar serves as food for the caterpillars of the ichneumon fly. When these have fed their accustomed time, and are about to change into the pupa state, they, by an instinct given them, attack the vital part of the caterpillar (a most wonderful economy in nature, that this process should be delayed until they have no more occasion for food.) They then spin themselves minute cases within the body of the caterpillar; and instead of a butterfly coming forth (which, if a female, would have probably laid six hundred eggs, thus producing as many caterpillars, whose food would be the cabbage,) a race of these little ichneumon flies issues forth, ready to perform the task assigned them, of keeping within due limits those fell destroyers of our vegetables.—Gill's Repos.

caution seems denied them; the treasures they lay up are no longer supposed intended for future provision, and the choice they make in their stores seems no way dictated by wisdom. It is, indeed, somewhat surprising, that almost every writer of antiquity should describe this insect as labouring in the summer, and feasting upon the produce during the winter.* Perhaps, in some of the warmer climates, where the winter is mild and of short continuance, this may take place; but in France and England these animals can have no manner of occasion for a supply of winter provisions, as they are actually in a state of torpidity during that season.†

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* Winter Provision of the Ant.—The younger Huber has given an interesting account of the hybernation of ants, which differs in some particulars from what we have observed of the wood-ant; but he speaks of ants in general. The subject, indeed, derives importance from the popular opinion, that they amass wheat and other grain as a winter store, having been refuted by the experiments of Gould and other accurate observers. "We have endeavoured," says M. Huber, "to explain their preservation, by supposing them to fall into a state of torpor at this period. They, in fact, become torpid during the intense cold, but when the season is not very severe, the depth of their nest guards them from the effects of the frost; they do not become torpid unless the temperature is reduced to the second degree of Réaumur under the freezing point (27° Fahrenheit). I have occasionally seen them walking upon the snow, engaged in their customary avocations. In so reduced a temperature, they would be exposed to the horrors of famine, were they not supplied with food by the pucerons, who, by an admirable concurrence of circumstances, which we cannot attribute to chance, become torpid at precisely the same degree of cold as the ants, and recover from this state also at the same time: the ants, therefore, always find them when they need them.

"Those ants that do not possess the knowledge of the mode of assembling these insects, are, at least, acquainted with their retreat; they follow them to the feet of the trees and the branches of the shrubs they before frequented, and pass at the first degree of frost along the hedges, following the paths which conduct to these insects. They bring back to the republic a small quantity of honey; a very little sufficing for their support in winter. As soon as the ants recover from their torpid state, they venture forth to procure their food. The aliment contained in their stomach is, on their return, equally distributed to their companions. These juices scarcely evaporate, during this season, owing to the thickness of the honey rings investing the body. I have known ants preserve, during a considerable time, their internal stock of provisions, when they could not impart it to their companions. When the cold increases in a gradual manner (and this is commonly what the ants experience, who are screened from it by a thick wall of earth,) they collect and lie upon each other by thousands, and appear all hooked together. Is this done in order to provide themselves a little heat? I presume this to be the case, but our thermometers are not sufficiently delicate to indicate if this be really the fact."—Huber on Ants.

† Hybernation of Insects.—The torpidity of insects during winter, which in some of its circumstances is analogous to sleep, will require the less to be discussed here, that we have, under our three former divisions of eggs, pupæ, and larvæ, considered it very amply. The number of insects, indeed, which hybernate in the perfect state are comparatively few. Of the brimstone butterfly (*gonepteryx rhamni*), Mr. Stephens tells us the second brood appears in autumn, "and of the latter," he adds, "many individuals of both sexes remain throughout the winter, and make their appearance on the first sunny day in spring. I have seen them sometimes so early as the middle of February." The commonly perfect state of the wings in such cases might, we think, lead to the contrary conclusion, that the butterfly has just been evolved from its chrysalis. Several other species, however, chiefly of the genus *vanessa*, do live through the winter in the perfect state; but this, as far as general observation extends, can only be affirmed of the female. Yet will insects bear almost incredible degrees of cold with impunity. Out of the multiplicity of instances of this on record we shall select two. In Newfoundland, Captain Buchan saw a lake, which in the evening was entirely still and frozen over, but as soon as the sun had dissolved the ice in the morning, it was all in a bustle of animation, in consequence, as was discovered, of myriads of flies let loose, while many still remained "infixed and frozen round." A still stronger instance is mentioned by Ellis, in which a large black mass, like coal or peat upon the hearth, dissolved, when thrown upon the fire, into a cloud of musquittoes (*culicidæ*).

It has been remarked by most writers upon the torpidity of warm-blooded animals, that cold does not seem to be its only cause, and the same apparently holds in the case of insects. Bees, indeed, which remain semi-torpid during the winter, may be prematurely

The common ants of Europe are of two or three different kinds; some red, some black, some with stings, and others without. Such as have stings, inflict their wounds in that manner; such as are unprovided with these weapons of defence, have a power of spurting, from their hinder parts, an acid pungent liquor, which, if it lights upon the skin, inflames and burns it like nettles.

The body of an ant is divided into the head, breast, and belly. In the head the eyes are placed, which are entirely black, and under the eyes there are two small horns or feelers, composed of twelve joints, all covered with a fine silky hair. The mouth is furnished with two crooked jaws, which project outwards, in each of which are seen incisures, that look like teeth. The breast is covered with a fine silky hair, from which project six legs, that are pretty strong and hairy, the extremities of each armed with two small claws, which the animal uses in climbing. The belly is more reddish than the rest of the body, which is of a brown chestnut colour, shining as glass, and covered with extremely fine hair.

From such a formation, this animal seems bolder, and more active, for its size, than any other of the insect tribe, and fears not to attack a creature, often above ten times its own magnitude.

As soon as the winter is past, in the first fine day in April, the ant-hill, that before seemed a desert, now swarms with new life, and myriads of these insects are seen just awaked from their annual lethargy, and preparing for the pleasures and fatigues of the season. For the first day they never offer to leave the hill, which may be considered as their citadel, but run over every part of it, as if to examine its present situation, to observe what injuries it has sustained during the rigours of winter (*g*), while they slept, and to meditate and settle the labours of the day ensuing.

At the first display of their forces, none but the wingless tribe appears, while those furnished with wings remain at the bottom. These are the working ants, that first appear, and that are always destitute of wings; the males and females, that are furnished with four large wings each, are more slow in making their appearance.

Thus, like bees, they are divided into males, females, and the neutral or the working tribe. These are all easily distinguished from each other; the females are much larger than the males; the working ants are the smallest of all. The two former have wings; which, however, they sometimes are divested of; the latter never have any, and upon them are devolved all the labours that tend to the welfare of the community. The female, also, may be distinguished, by the colour and structure of her breast, which is a little more brown than that of the common ant, and a little brighter than that of the male.

In eight or ten days after their first appearance, the labours of the hill are in some forwardness; the males and females are seen mixed with the working multitude, and pursued or pursuing each other. They seem no way to partake in the common drudgeries of the state; the males pursue the females with great

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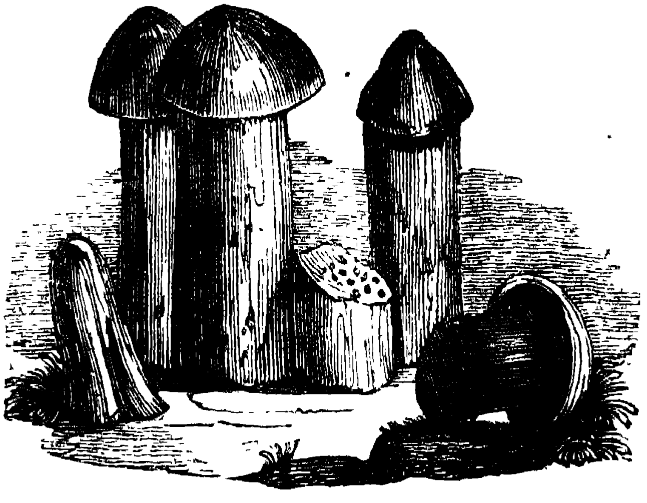
animated into activity by the occurrence of some days of extraordinary mildness in spring; but, what is not a little wonderful and inexplicable, they are not roused by much milder weather when it occurs before Christmas,—on the same principle, perhaps, that a man is more easily awakened after he has slept six or seven hours than in the earlier part of the night. Immediately after the first severe frost in the winter of 1829-30, we dug down into the lower chambers of a nest of the wood-ant (*formica rufa*), at Forest-hill, Kent, which we had thatched thickly with fern leaves the preceding November, both to mark the spot and to protect the ants in winter. About two feet deep we found the little colonists all huddled up in contiguous separate chambers, quite motionless till they were exposed to the warm sunshine, when they began to drag themselves sluggishly and reluctantly along. Even upon bringing some of them into a warm room, they did not awaken into summer activity, but remained lethargic, unwilling to move, and refusing to eat, and continued in the same state of semi-torpidity till their brethren in the woods began to bestir themselves to repair the damages caused by the winter storms in the outworks of their encampments.—INSECT TRANSFORMATIONS.

(*g*) Memoires pour servir à l'Histoire des Insectes, par Charles de Geer.

assiduity, and, in a manner, force them to compliance. They remain coupled for some time, while the males, thus united, suffer themselves to be drawn along by the will of their partners.

In the mean time, the working body of the state take no part in their pleasures; they are seen diligently going from the ant-hill, in pursuit of food for themselves and their associates, and of proper materials for giving a comfortable retreat to their young, or safety to their habitation. In the fields of England, ant-hills are formed with but little apparent regularity. In the more southern provinces of Europe, they are constructed with wonderful contrivance, and offer a sight highly worthy a naturalist's curiosity. These are generally formed in the neighbourhood of some large tree and a stream of water. The one is considered by the animals as the proper place for getting food; the other for supplying them with moisture, which they cannot well dispense with.* The shape of the ant-hill is that of a sugarloaf, about three feet high, composed of various substances; leaves, bits of wood, sand, earth, bits of gum, and grains of corn. These are all united into a compact body, perforated with galleries down to the bottom, and winding ways within the body of the structure. From this retreat to the water, as well as to the tree, in different directions, there are many paths worn by constant assiduity, and along these the busy insects are seen passing and repassing continually; so that from May, or the beginning of June, according to the state of the season, they work continually, till the bad weather comes on.

The chief employment of the working ants, is in sustaining not only the idlers at home, but also finding a sufficiency of food for themselves. They live upon various provisions, as well of the vegetable as of the animal kind. Small insects they will kill and devour; sweets of all kinds they are particularly fond of. They seldom, however, think of their community, till they themselves are first satiated. Having found a juicy fruit, they swallow what they can, and then tearing it in pieces, carry home their load. If they meet with an insect above their match, several of them will fall upon it at once, and having mangled it, each will carry off a part of the spoil. If they meet,



(Turret-Building White Ants.†)

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* Dislike of Water.—Ants have a great dislike to water, when it exceeds that of a light shower to moisten their building materials. One species, mentioned by De Azara as indigenous to South America, instinctively builds a nest from three to six feet high, to provide against the inundations during the rainy season. Even this, however, does not always save them from submersion; and, when that occurs, they are compelled, in order to prevent themselves from being swept away, to form a group, somewhat similar to the curtain of the wax-workers of hive-bees. The ants constituting the basis of this group, lay hold of some shrub for security, while their companions hold on by them; and thus the whole colony, forming an animated raft, floats on the surface of the water till the inundation (which seldom continues longer than a day or two) subsides.—Insect Arc.

† Turret-Building White Ants.—Apparently more than one species, smaller than the preceding, such as the *Termes mordax* and *T. atrox* of Smeathman, construct nests of a very different form, the figures of which resemble a pillar, with a large mushroom for a capital. These turrets are composed of well-tempered black earth, and stand nearly three feet high. The conical mushroom-shaped roof is composed of the same ma-

in their excursions, any thing that is too heavy for one to bear, and yet, which they are unable to divide, several of them will endeavour to force it along; some dragging and others pushing. If any one of them happens to make a lucky discovery, it will immediately give advice to others; and then at once, the whole republic will put themselves in motion. If in these struggles, one of them happens to be killed, some kind survivor will carry him off to a great distance, to prevent the obstructions his body may give to the general spirit of industry.

But while they are thus employed in supporting the state, in feeding abroad, and carrying in provisions to those that continue at home, they are not unmindful of posterity. After a few days of fine weather, the female ants begin to lay their eggs, and those are as assiduously watched and protected by the working ants, who take upon themselves to supply whatever is wanting to the nascent animal's convenience or necessity. They are carried, as soon as laid, to the safest situation, at the bottom of their hill, where they are carefully defended from cold and moisture. We are not to suppose that those white substances which we so plentifully find in every ant-hill, are the eggs as newly laid. On the contrary, the ant's egg is so very small, that, though laid upon a black ground, it can scarcely be discerned. The little white bodies we see, are the young animals in their maggot state, endued with life, long since freed from the egg, and often involved in a cone, which it has spun round itself, like the silk-worm. The real egg, when laid, if viewed through a microscope, appears smooth, polished, and shining, while the maggot is seen composed of twelve rings, and is oftener larger than the ant itself.

It is impossible to express the fond attachment which the working ants show to their rising progeny.* In cold weather they take them in their mouths, but

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terial, and the brims hang over the column, being three or four inches wider than its perpendicular sides. Most of them, says Smeathman, resemble in shape the body of a round windmill, but some of the roofs have a little elevation in the middle. When one of these turrets is completed, the insects do not afterwards enlarge or alter it; but if it be found too small for them, they lay the foundation of another at a few inches' distance. They sometimes, but not often, begin the second before the first is finished and a third before they have completed the second. Five or six of these singular turrets in a group may be seen in the thick woods at the foot of a tree. They are so very strongly built, that in case of violence, they will sooner tear up the gravel and solid heart of their foundation than break in the middle When any of them happen to be thus thrown down, the insects do not abandon them; but, using their overturned column as a basis, they run up another perpendicularly from it, to the usual height, fastening the under part at the same time to the ground, to render it the more secure.

The interior of a turret is pretty equally divided into innumerable cells, irregular in shape, but usually more or less angular, generally quadrangular or pentagonal, though the angles are not well defined Each shell has at least two entrances; but there are no galleries, arches. nor wooden nurseries, as in the nests of the Warrior (*T. bellicosus*). The two species which build turret nests are very different in size, and the dimensions of the nests differ in proportion.—INSECT ARCHI.

* AFFECTION OF INSECTS FOR THEIR YOUNG.—The affection displayed by insects for their young, and the industry and perseverance with which they labour to provide for them, have frequently been the subject of interesting observations and remarks by different naturalists.

This subject has been very ably treated in that well-known and valuable work, the "Introduction to Entomology," of Kirby and Spence; and amongst other instances, they refer to an account of a singular species of the beetle (*Necrophorus Vespillo*, F), first noticed by M. Gleditsch in the Acts of the Berlin Society for 1752. He begins by stating that he had often remarked that dead moles, when laid upon the ground, especially if upon loose earth, were almost sure to disappear in the course of two or three days, often of twelve hours. To ascertain the cause, he placed a mole upon one of the beds in his garden. It had vanished by the third morning; and on digging where it had been laid, he found it buried to the depth of three inches, and under it, four beetles, which seemed to have been the agents in this singular inhumation. Not perceiving anything particular in the mole, he buried it again; and on examining it again at the end of six days, he found it swarming with maggots, apparently the issue of the beetles, which M. Gleditsch now naturally concluded had buried the carcass for the food of their future without offering them the smallest injury, to the very depths of their habitation, where they are less subject to the severity of the season. In a fine day they remove them, with the same care, nearer the surface, where their maturity may be assisted by the warm beams of the sun. If a formidable enemy should come to batter down their whole habitation, and crush them by thousands in the ruin, yet these wonderful insects, still mindful of their parental duties, make it their first care to save their offspring. They are seen running wildly about, and different ways, each loaded with a young one, often bigger than the insect that supports it. I have kept, says Swammerdam, several of the working ants in my closet, with their young, in a glass filled with earth. I took pleasure in observing, that in proportion as the earth dried on the surface, they dug deeper and deeper to deposit their eggs; and when I poured water thereon, it was surprising to see with what care, affection, and diligence they laboured, to put their brood in safety, in the driest place. I have seen, also, that when water has been wanting for several days, and when the earth was moistened after it a little, they immediately carried their young ones to have a share, who seemed to enjoy and suck the moisture.

When the young maggot is come to its full growth, the breast swells insensibly, it casts its skin, and loses all motion. All the members which were hidden before, then begin to appear, an aurelia is formed, which represents very distinctly all the parts of the animal, though they are yet without motion, and, as it were, wrapped up in swaddling-clothes. When, at length, the little insect has passed through all its changes, and acquired its proper maturity, it bursts this last skin, to assume the form it is to retain ever after. Yet this is not done by the efforts of the little animal alone, for the old ones very assiduously break open, with their teeth, the covering in which it is inclosed. Without this assistance, the aurelia would never be able to get free, as Mr. De Geer often found, who tried the experiment, by leaving the aurelia to themselves. The old ones not only assist them, but know the very precise time for lending their assistance;

young. To determine these points more clearly, he put four of these insects into a glass vessel half filled with earth, and properly secured, and upon the surface of the earth two frogs. In less than twelve hours one of the frogs was interred by two of the beetles: the other ran about the whole day, as if busied in measuring the dimensions of the remaining corpse, which, on the third day, was also found buried. He then introduced a dead linnet. A pair of the beetles were soon engaged upon the bird. They began their operations by pushing out the earth from under the body so as to form a cavity for its reception; and it was curious to see the efforts which the beetles made by dragging at the feathers of the bird from below to pull it into its grave. The male having driven the female away, continued the work alone for five hours. He lifted up the bird, changed its place, turned it, and arranged it in the grave, and from time to time came out of the hole, mounted upon it, and trod it under foot, and then retired below and pulled it down. At length, apparently wearied with this uninterrupted labour, it came forth and leaned its head upon the earth beside the bird, without the smallest motion, as if to rest itself, for a full hour, when it again crept under the earth. The next day, in the morning, the bird was an inch and a half under ground, and the trench remained open the whole day, the corpse seeming as if laid out upon a bier, surrounded with a rampart of mould.. In the evening it had sunk half an inch lower, and in another day the work was completed, and the bird covered. M. Gleditsch continued to add other small dead animals, which were all, sooner or later, buried; and the result of this experiment was, that in fifty days four beetles had interred, in the very small space of earth allotted to them, twelve carcasses, viz., four frogs, three small birds, two fishes, one mole, and two grasshoppers, besides the entrails of a fish, and two morsels of the lungs of an ox In another experiment, a single beetle buried a mole forty times its own bulk and weight in two days. It is plain that all this labour is incurred for the sake of placing in security the future young of these industrious insects, along with a necessary provision of food. One mole would have sufficed a long time for the repast of the beetles themselves, and they could have more conveniently fed upon it above ground than below. But if they had left thus exposed the carcass in which their eggs were deposited, both would have been exposed to the imminent risk of being destroyed at a mouthful by the first fox or kite that chanced to espy them.—Zoological Magazine.

for, if produced too soon, the young one dies of cold; if retarded too long, it is suffocated in its prison.

When the female has done laying, and the whole brood is thus produced, her labours, as well as that of the male, become unnecessary; and her wings, which she had but a short time before so actively employed, drop off. What becomes of her when thus divested of her ornaments is not well known, for she is seen in the cells for some weeks after. The males, on the other hand, having no longer any occupation at home, make use of those wings with which they have been furnished by nature, and fly away, never to return, to be heard of more. It is probable they perish with the cold, or are devoured by the birds, which are particularly fond of this petty prey.

In the mean time, the working ants having probably deposed their queens, and being deserted by the males, that served but to clog the community, prepare for the severity of the winter, and bury their retreats as deep in the earth as they conveniently can. It is now found that the grains of corn, and other substances with which they furnish their hill, are only meant as fences to keep off the rigours of the weather, not as provisions to support them during its continuance. It is found generally to obtain, that every insect that lives a year after it is come to its full growth, is obliged to pass four or five months without taking any nourishment, and will seem to be dead all that time. It would be to no purpose, therefore, for ants to lay up corn for the winter, since they lie that time without motion, heaped upon each other, and are so far from eating, that they are utterly unable to stir. Thus, what authors have dignified by the name of a magazine, appears to be no more than a cavity, which serves for a common retreat when the weather forces them to return to their lethargic state.*

What has been said with exaggeration of the European ant, is however true, if asserted of those of the tropical climates. They build an ant-hill with great contrivance and regularity, they lay up provisions, and, as they probably live the whole year, they submit themselves to regulations entirely unknown among the ants of Europe.

Those of Africa are of three kinds, the red, the green, and the black; the latter are above an inch long, and in every respect a most formidable insect. Their sting produces extreme pain, and their depredations are sometimes extremely destructive. They build an ant-hill of a very great size, from six to twelve feet high: it is made of viscous clay, and tapers into a pyramidal form.

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* Yellow Ants.—Mr. Knapp describes a still more curious structure of another species of ant common in this country:—"One year," says he, "on the 3rd of March, my labourer being employed in cutting up ant-hills, or tumps, as we call them, exposed to view multitudes of the yellow species (*Formica flava*) in their winter's retirement. They were collected in numbers in little cells and compartments, communicating with others by means of narrow passages. In many of the cells they had deposited their larvæ, which they were surrounding and attending, but not brooding over or covering. Being disturbed by our rude operations, they removed them from our sight to more hidden compartments. The larvæ were small. Some of these ant-hills contained multitudes of the young of the wood-louse (*Oniscus armadillo*), inhabiting, with perfect familiarity, the same compartments as the ants, crawling about with great activity with them, and perfectly domesticated with each other. They were small and white; but the constant vibration of their antennæ, and the alacrity of their motions, manifested a healthy vigour. The ants were in a torpid state; but on being removed into a temperate room, they assumed much of their summer's animation. How these creatures are supported during the winter season it is difficult to comprehend; as in no one instance could we perceive any store or provision made for the supply of their wants. The minute size of the larvæ manifested that they had been recently deposited; and consequently that their parents had not remained during winter in a dormant state, and thus free from the calls of hunger. The preceding month of February, and part of January, had been remarkably severe; the frost had penetrated deep into the earth, and long held it frozen; the ants were in many cases not more than four inches beneath the surface, and must have been inclosed in a mass of frozen soil for a long period; yet they, their young, and the onisci, were perfectly uninjured by it: affording another proof of the fallacy of the commonly received opinion, that cold is *universally* destructive to insect life."—Jour. of a Nat.

This habitation is constructed with great artifice; and the cells are so numerous and even, that a honey-comb scarce exceeds them in number and regularity.*

The inhabitants of this edifice seem to be under a very strict regulation. At the slightest warning they will sally out upon whatever disturbs them; and if they have time to arrest their enemy, he is sure to find no mercy. Sheep, hens, and even rats are often destroyed by these merciless insects, and their flesh devoured to the bone. No anatomist in the world can strip a skeleton so cleanly as they; and no animal, how strong soever, when they have once seized upon it, has power to resist them.

It often happens that these insects quit their retreat in a body, and go in quest of adventures.† "During my stay," says Smith, "at Cape Corse Castle, a body of these ants came to pay us a visit in our fortification. It was about daybreak when the advanced guard of this famished crew entered the chapel, where some negro servants were asleep upon the floor. The men were quickly alarmed at the invasion of this unexpected army, and prepared, as well as they could, for a defence. While the foremost battalion of insects had already taken possession of the place, the rear-guard was more than a quarter of a mile distant. The whole ground seemed alive, and crawling with unceasing destruction. After deliberating a few moments upon what was to be done, it was resolved to lay a large train of gunpowder along the path they had taken: by this means millions were blown to pieces, and the rear-guard perceiving the destruction of their leaders, thought proper instantly to return, and make back to their original habitation."

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* Structures of Termites, or White Ants.—When we look back upon the details which we have given of the industry and ingenuity of numerous tribes of insects, both solitary and social, we are induced to think it almost impossible that they could be surpassed. The structures of wasps and bees, and still more those of the wood-ant (*Formica rufa*), when placed in comparison with the size of the insects, equal our largest cities compared with the stature of man. But when we look at the buildings erected by the white ants of tropical climates, all that we have been surveying dwindles into insignificance. Their industry appears greatly to surpass that of our ants and bees, and they are certainly more skilful in architectural contrivances. The elevation, also, of their edifices, is more than five hundred times the height of the builders. Were our houses built according to the same proportions, they would be twelve or fifteen times higher than the London Monument, and four or five times higher than the pyramids of Egypt, with corresponding dimensions in the basements of the edifices. These statements are, perhaps, necessary, to impress the extraordinary labours of ants upon the mind; for we are all more or less sensible to the force of comparisons. The analogies between the works of insects and of men are not perfect, for insects are all provided with instruments, peculiarly adapted to the end which they instinctively seek, while man has to form a plan by progressive thought and upon the experience of others, and to complete it with tools which he also invents.

The termites do not stand above a quarter of an inch high, while their nests are frequenty twelve feet; and Jobson mentions some which he had seen as high as twenty feet; "of compasse," he adds, "to contayne a dozen men, with the heat of the sun baked into that hardnesse, that we used to hide ourselves in the ragged toppes of them when we took up stands to shoot at deere or wild beasts." Bishop Heber saw a number of these high ant-hills in India, near the principal entrance of the Sooty, or Moorshedabad river. "Many of them," he says, "were five or six feet high, and probably seven or eight feet in circumference at the base, partially overgrown with grass and ivy, and looking at a distance like the stumps of decayed trees. I think it is Ctesias, among the Greek writers, who gives an account, alluded to by Lucian, in his 'Cock,' of monstrous ants in India, as large as foxes. The falsehood probably originated in the stupendous fabrics which they rear here, and which certainly might be supposed to be the work of a much larger animal than their real architect." Herodotus has a similar fable of the enormous size and brilliant appearance of the ants of India.

Nor is it only in constructing dwellings for themselves that the termites of Africa, and of other hot climates, employ their masonic skill. Though, like our ants and wasps, they are almost omnivorous, yet wood, particularly when felled and dry, seems their favourite article of food; but they have an utter aversion to feeding in the light, and always eat their way with all expedition into the interior. It thence would seem necessary for them either to leave the bark of a tree, or the outer portion of the beam or door of a house, undevoured, or to eat in open day. They do neither; but are at the trouble of constructing galleries of clay, in which they can conceal themselves, and feed in security. In all their foraging excursions, indeed, they build covert ways, by which they can go out and return to their encampment.—Insect Arc.

† Amusements of Insects.—In speaking of what appear to be the sports of insects, we cannot omit taking notice of the very singular proceedings of some species of ants, which, at the intervals of busy industry, amuse themselves with something apparently analogous to our wrestling and racing matches. Bonnet says, he observed a small species of ants, which employed themselves in carrying each other on their backs, the rider holding with his mandibles the neck of his bearer, and embracing it closely with his legs, the position which the renowned John Gilpin may have sometimes been disposed to assume in his famous race through Edmonton. But though the very palpable mistakes committed by Bonnet respecting these very ants may, perhaps, tend to invalidate his authority with respect to their riding, we have the undoubted testimony of both Gould and Huber for their

The order which these ants observe seems very extraordinary; whenever they sally forth, fifty or sixty larger than the rest are seen to head the band, and conduct them to their destined prey. If they have a fixed spot where their prey continues to resort, they then form a vaulted gallery, which is sometimes a quarter of a mile in length; and yet they will hollow it out in the space of ten or twelve hours.*

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wrestlings. "You may frequently," says Gould, "perceive one of these ants (*Formica rufa*, Latr.) run to and fro with a fellow-labourer in his forceps, of the same species and colony." Mr. Gould observed, that, after being carried for some time, it was let go in a friendly manner, and received no personal injury. This amusement is often repeated, particularly among the hill ants, who are very fond of this sportive exercise.

It was amongst the same species that Huber observed similar proceedings, which he has described with his usual minuteness and accuracy. "I approached," he says, "one day, to the formicary of wood ants, exposed to the sun and sheltered from the north. The ants were heaped upon one another in great numbers, and appeared to enjoy the temperature on the surface of the nest. None of them were at work, and the immense multitude of insects presented the appearance of a liquid in the state of ebullition, upon which the eye could scarcely be fixed without difficulty; but when I examined the conduct of each ant, I saw them approach one another, moving their antennæ with astonishing rapidity, while they patted with a slight movement the cheeks of other ants. After these preliminary gestures, which resembled caressing, they were observed to raise themselves upright on their hind legs by pairs, struggle together, seize each other by a mandible, foot, or antenna, and then immediately relax their hold to recommence the attack. They fastened upon each other's shoulders, or bellies, embraced and overthrew each other, then raised themselves by turns, taking their revenge without producing any serious mischief. They did not spurt out their venom as in their combats, nor retain their opponents with that obstinacy which we observe in their real quarrels. They presently abandoned those which they had first seized, and endeavoured to catch others. I have seen some who were so eager in these exercises, that they pursued several workers in succession, and struggled with them a few moments, the skirmish only terminating when the least animated, having overthrown his antagonist, succeeded in escaping and hiding in one of the galleries. In one place, two ants appeared to be gamboling about a stalk of grass,—turning alternately to avoid or seize each other, which brought to my recollection the sport and pastime of young dogs when they rise on their hind-legs, attempting to bite, overthrow, and seize each other, without once closing their teeth. To witness these facts, it is necessary to approach the ant-hills with much caution, that the ants should have no idea of our presence; if they had, they would cease at the moment their plays or their occupations, would put themselves in a posture of defence, curve up their tails, and ejaculate their venom."—INSECT TRANSFORMATIONS.

* BATTLE OF ANTS.—A paper by M. Hanhart, in a number of the *Bull. Univ.*, describes a very remarkable battle which he witnessed between two species of ants; one the *formica rufa*, and the other a little black ant, which he does not name (probably the *fofusca*).

M. Hanhart witnessed these insects approach in armies composed of their respective swarms, and advancing towards each other, in the greatest order. The *formica rufa* marched with one in front, on a line from nine to twelve feet in length, flanked by several corps in square masses, composed of from thirty to sixty individuals.

The second species (little blacks) forming an army much more numerous, marched to meet the enemy in a very extended line, and from one to three individuals abreast. They left a detachment at the foot of their hillock, to defend it against any unlooked-for attack. The rest of the army marched to the battle, with its right wing supported by a solid corps

CHAP. VI.

THE BEETLE AND ITS VARIETIES.

HITHERTO we have been treating of insects with four transparent wings; we now come to a tribe with two transparent wings, with cases that cover them close while at rest, but which allow them their proper play when flying. The principal of these are the Beetle, the May Bug, and the Cantharis. These are all bred like the rest of their order, first from eggs, then they become grubs, then a chrysalis, in which the parts of the future fly are distinctly seen, and lastly, the animal leaves its prison, breaking forth as a winged animal in full maturity.

Of the beetle there are various kinds; all, however, concurring in one common formation of having cases to their wings, which are the more necessary to those insects, as they often live under the surface of the earth, in holes which they dig out by their own industry. These cases prevent the various injuries their real wings might sustain, by rubbing or crushing against the sides of their abode. These, though they do not assist flight, yet keep the internal wings clean and even, and produce a loud, buzzing noise, when the animal rises in the air.

If we examine the formation of all animals, of the beetle kind, we shall find, as in shell-fish, that their bones are placed externally, and their muscles within. These muscles are formed very much like those of quadrupeds, and are endued

of several hundred individuals, and the left wing supported by a similar body of more than a thousand.

These groups advanced in the greatest order, and without changing their positions. The two lateral corps took no part in their principal action: that of the right wing made a halt, and formed an army of reserve; whilst the corps which marched in column on the left wing manœuvred, so as to turn the hostile army, and advanced with a hurried march to the hillock of the *formica rufa*, and took it by assault.

The two armies attacked each other, and fought a long time without breaking their lines. At length, disorder appeared in various points, and the combat was maintained in detached groups; and after a bloody battle, which continued from three to four hours, the *formica rufa* were put to flight, and forced to abandon their two hillocks, and go off to establish themselves at some other point with the remains of their army.

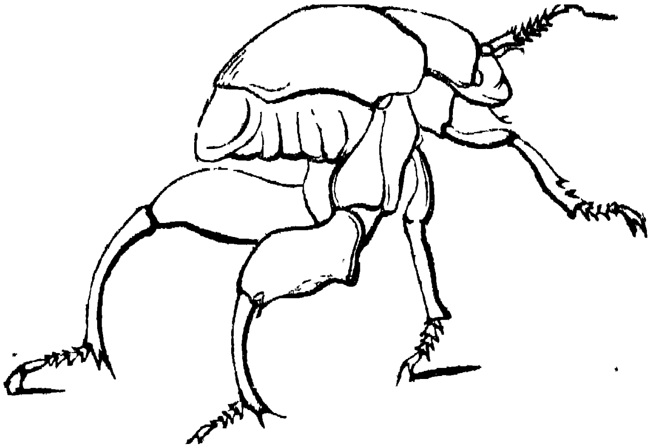
The most interesting fact of this exhibition, says M. Hanhart, was to see these insects reciprocally making prisoners, and transporting their own wounded to their hillocks.

It has been already known, from the observations of M. Huber, that when an ant-hillock is taken by the enemy, the vanquished are reduced to slavery, and employed in the interior labours of their habitation.—MECHANIC'S MAGAZINE.

DEATH-WATCHES. — All the species of termites are not social; but the solitary ones do not, like their congeners, distinguish themselves in architecture. In other respects, their habits are more similar; for they destroy almost every substance, animal and vegetable. The most common of the solitary species must be familiar to all our readers by the name of wood-louse (*Termes pulsatorium*, Linn.; *Atropos lignarius*, Leach) — one of the insects which produces the ticking, superstitiously termed the *death-watch*. It is not so large as the common louse, but whiter, and more slender, having a red mouth and yellow eyes. It lives in old books, the paper on walls, collections of insects and dried plants, and is extremely agile in its movements, darting, by jerks, into dark corners, for the purpose of concealment. It does not like to run straight forward, without resting every half-second, as if to listen or look about for its pursuer, and at such resting times it is easily taken. The ticking noise is made by the insect beating against the wood with its head; and it is supposed by some to be peculiar to the female, and to be connected with the laying of her eggs. M. Latreille, however, thinks that the wood-louse is only the grub of the *Psocus abdominalis*, in which case it could not lay eggs; but this opinion is somewhat questionable. Another death-watch is a small beetle (*Anobium tesselatum*).—INSECT ARCHITECTURE.

with such surprising strength, that, bulk for bulk, they are a thousand times stronger than those of a man. The strength of these muscles is of use in digging the animal's subterraneous abode, where it is most usually hatched, and to which it most frequently returns, even after it becomes a winged insect, capable of flying.

Beside the difference which results from the shape and colour of these animals, the size also makes a considerable one; some beetles being not larger than the head of a pin, while others, such as the elephant-beetle, are as big as one's fist. But the greatest difference among them is, that some are produced in a month, and in a single season go through all the stages of their existence, while others take near four years to their production, and live as winged insects a year more. To give the history of all these animals, that are bred pretty much in the same way, would be insipid and endless; it will suffice to select one or two from the number, the origin of which may serve as specimens of the rest. I will, therefore, offer the history of the may-bug to the reader's attention, premising that most other beetles, though not so long lived, are bred in the same manner.



(The Kangaroo Beetle.*)

The may-bug, or dorr-beetle, as some call it, has, like all the rest, a pair of cases to its wings, which are of a reddish brown colour, sprinkled with a whitish dust, which easily comes off. In some years their necks are seen covered with a red plate, and in others, with a black; these, however, are distinct sorts, and their difference is by no means accidental. The fore-legs are very short, and the better calculated for burrowing in the ground, where this insect makes its retreat. It is well known for its evening buzz to children, but still more formidably introduced to the acquaintance of husbandmen and gardeners; for in some seasons, it has been found to swarm in such numbers, as to eat up every vegetable production.

The two sexes in the may-bug are easily distinguished from each other, by the superior length of the tufts at the end of the horns, in the male. They begin to copulate in summer, and at that season they are seen joined together for a considerable time. The female being impregnated, quickly falls to boring a hole into the ground, where to deposit her burthen. This is generally about half a foot-deep, and in it she places her eggs, which are of an oblong shape, with great regularity, one by the other. They are of a bright yellow colour, and no way wrapped up in a common covering, as some have imagined. When the female is lightened of her burthen, she again ascends from her hole, to live as before, upon leaves and vegetables, to buzz in the summer evening, and to lie hid among the branches of trees in the heat of the day.†

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* **Kangaroo Beetle** (*Scarabæus macropus*), which is supposed to be a native of Potosi, in South America. Its resemblance to the Kangaroo, in the disproportionate length of the hind legs. explains its name; and the grotesque appearance of the insect is shown in the sketch, which is about two-thirds of the natural size.—Ed.

† **Organs of Sensation in Insects.**—The existence of a brain in insects has been denied, but they have certainly a part analogous to this important organ, in its situation, and in its sending forth nerves to the principal organs of the senses. From this, which consists of two lobes, proceeds the spinal marrow—a cord which is sometimes single, but usually double, uniting at intervals, expanding into several knots or ganglins, each of which may be considered in some degree as a centre of vitality, or little brain.

The nerves of insects, as of other animals, are white filaments running from the

In about three months after these eggs have been thus deposited in the earth, the contained insect begins to break its shell, and a small grub or maggot crawls forth, and feeds upon the roots of whatever vegetable it happens to be nearest. All substances of this kind seem equally grateful, yet it is probable the mother insect has a choice among what kind of vegetables she shall deposit her young. In this manner these voracious creatures continue in the worm state for more than three years, devouring the roots of every plant they approach, and making their way under ground, in quest of food, with great despatch and facility. At length they grow to above the size of a walnut, being a great, thick, white maggot with a red head, which is seen most frequently in new turned earth, and which is so eagerly sought after by birds of every species. When largest, they are found an inch and a half long, of a whitish yellow colour, with a body consisting of twelve segments or joints, on each side of which there are nine breathing holes, and three red feet. The head is large, in proportion to the body, of a reddish colour, with a pincer before, and a semi-circular lip, with which it cuts the roots of plants, and sucks out their moisture. As this insect lives entirely under ground, it has no occasion for eyes, and accordingly it is found to have none; but is furnished with two feelers, which, like the crutch of a blind man, serve to direct its motions. Such is the form of this animal, that lives for years in the worm state under ground, still voracious, and every year changing its skin.

It is not till the end of the fourth year that this extraordinary insect prepares to emerge from its subterraneous abode, and even this is not effected but by a tedious preparation. About the latter end of autumn, the grub begins to perceive the approach of its transformation, it then buries itself deeper and deeper in the earth, sometimes six feet beneath the surface, and there forms itself a capacious apartment, the walls of which it renders very smooth and shining, by the excretions of its body. Its abode being thus formed, it begins soon after to shorten itself, to swell, and to burst its last skin, in order to assume the form of a chrysalis. This, in the beginning, appears of a yellowish colour, which heightens by degrees, till at last it is seen nearly red. Its exterior form plainly discovers all the vestiges of the future winged insect, all the fore-parts being distinctly seen: while behind, the animal seems as if wrapped in swaddling-clothes.

The young may-bug continues in this state for about three months longer, and it is not till the beginning of January that the aurelia divests itself of all its impediments and becomes a winged insect, completely formed. Yet still the animal is far from attaining its natural strength, health, and appetite. It undergoes a kind of infant imbecility, and, unlike most other insects, that the instant they become flies are arrived at their state of full perfection, the may-bug continues feeble and sickly. Its colour is much brighter than in the perfect animal, all parts are soft, and its voracious nature seems for awhile to have entirely forsaken it. As the animal is very often found in this state, it is supposed, by those unac-

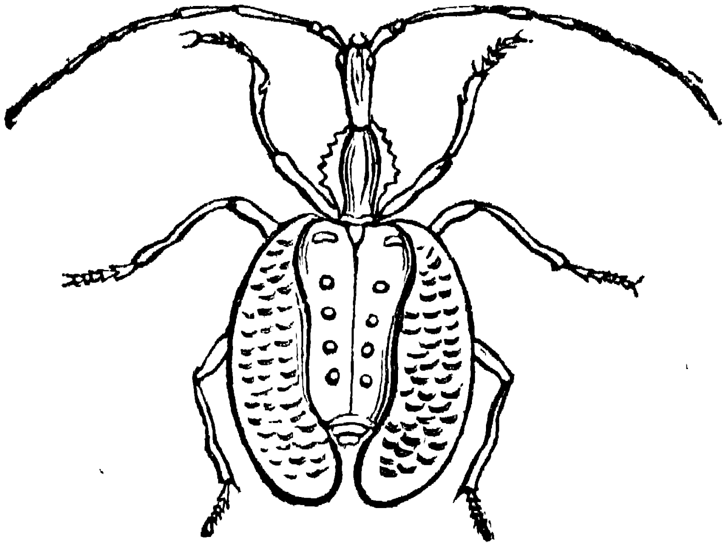
brain and spinal marrow, to every part of the body.

In the nervous system of insects there is, however, great variety, and a gradual change takes place in it, when insects undergo their metamorphoses; doubtless that it may be adapted to the altered functions of the animal, in its new stage of existence.

In animals with warm blood, sensation travels by means of the nerves and spinal marrow to the brain, where also all its perceptions terminate; and if the communication be cut off at the neck, the whole trunk becomes paralytic. But if the heads of insects be cut off, the remainder of the body will continue to give proofs of life and sensation longer than the head: both portions will live; but the largest will survive the longest, and will move, walk, and occasionally fly, at first almost as actively without the head as when united to it. If one insect be cut in two, the halves will live and appear vigorous, even for a fortnight afterwards: and what is more remarkable, the tail part always survives the head two or three days. Thus the spinal marrow, as well as the brain of the insects, is concerned in sensation.

In their movements we observe the union of instinct and the senses. When a bee flies to a field, or a garden, its senses direct it to the flowers, and enable it to discover the treasures of which it is in search; and then its instinct teaches it to imbibe the nectar, and load its hind legs with pollen: and on its return, they are still in operation. The organs of sense are manifest on dissection, but what is the power which directs their employment?

quainted with its real history, that the old ones, of the former season, have buried themselves for the winter, in order to revisit the sun the ensuing summer. But the fact is, the old one never survives the season, but dies, like all the other winged tribe of insects, from the severity of cold in winter.



(The Spectre Leaf.[*])

About the latter end of May, these insects, after having lived for four years under ground, burst from the earth, when the first mild evening invites them abroad. They are at that time seen rising from their long imprisonment, from living only upon roots, and imbibing only the moisture of the earth, to visit the mildness of the summer air, to choose the sweetest vegetables for their banquet, and to drink the dew of the evening. Wherever an attentive observer then walks abroad, he will see them bursting up before him in his pathway, like ghosts on a theatre. He will see every part of the earth, that had its surface beaten into hardness, perforated by their egression. When the season is favourable for them, they are seen by myriads buzzing along, hitting against every object that intercepts their flight. The mid-day sun, however, seems too powerful for their constitutions; they then lurk under the leaves and branches of some shady tree, but the willow seems particularly their most favourite food; there they lurk in clusters, and seldom quit the tree till they have devoured all its verdure. In those seasons which are favourable to their propagation, they are seen in an evening as thick as flakes of snow, and hitting against every object with a sort of capricious blindness. Their duration, however, is but short, as they never survive the season. They begin to join shortly after they have been let loose from their prison; and when the female is impregnated, she cautiously bores a hole in the ground, with an instrument fitted for that purpose, which she is furnished with at the tail, and there deposits her eggs, generally to the number of three score. If the season and the soil be adapted to their propagation, these soon multiply as already described, and go through the noxious stages of their contemptible existence. This insect, however, in its worm state, though prejudicial to man, makes one of the chief repasts of the feathered tribe, and is generally the first nourishment with which they supply their young. Rooks and hogs are particularly fond of these worms, and devour them in great numbers. The inhabitants of the county of Norfolk, some time since, went into the practice of destroying their rookeries, but in proportion as they destroyed one plague, they were pestered with a greater; and these insects multiplied in such an amazing abundance, as to destroy not only the verdure of the fields, but even the roots of vegetables, not yet shot forth. One farm in particular was so injured by them in the year 1751, that the occupier was not able to pay his rent; and the landlord was not only content to lose his income for that year, but also gave money for the support of the farmer and his family. In Ireland they suffered so much by these insects, that they came to a resolution of setting fire to a wood of some miles in extent, to prevent their mischievous propagation.

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[*] Spectre Leaf (*Marmollyce Phillodes.*)—This is a Javanese species of coleoptera (first order, with four wings), belonging to, but totally unlike every known form comprised in, the Linnæan genus carabus; and remarkable for its flatness, and the great delatation and posterior production of the sides of the elytra, or wing cases. The insect, indeed, at first sight, looks more like a piece of rolled gingerbread (Italian jumbles), such as we now see in the London biscuit-bakers' windows, than an animal. Upwards of thirty specimens of this extraordinary insect have recently been brought from Java to England.—Ed.

Of all the beetle kind this is the most numerous, and therefore deserves the chief attention of history. The numerous varieties of other kinds might repay the curiosity of the diligent observer, but we must be content in general to observe, that in the great outlines of the history, they resemble those of which we have just been giving a description; like them, all other beetles are bred from the egg, which is deposited in the ground, or sometimes, though seldom, in the barks of trees, they change into a worm; they subsist in that state by living upon the roots of vegetables, or the succulent parts of the bark round them. They generally live a year at least before they change into an aurelia; in that state they are not entirely motionless, nor entirely swaddled up without form.

It would be tedious and endless to give a description of all, and yet it would be an unpardonable omission not to mention the particularities of some beetles, which are singular rather from their size, their manners, or their formation.* That beetle which the Americans call the tumble-dung, particularly demands our attention; it is all over of a dusky black, rounder than those animals are generally found to be, and so strong, though not much larger than the common black beetle, that if one of them be put under a brass candlestick, it will cause it to move backwards and forwards, as if it were by an invisible hand, to the admiration of those who are not accustomed to the sight; but this strength is given it for much more useful purposes than those of exciting human curiosity, for there is no creature more laborious, either in seeking subsistence, or in providing a proper retreat for its young. They are endowed with sagacity to discover subsistence by their excellent smelling, which directs them in flights to excrements just fallen from man or beast, on which they instantly drop, and fall unanimously to work in forming round balls or pellets thereof, in the middle of which they lay an egg. These pellets, in September, they convey three feet deep in the earth, where they lie till the approach of spring, when the eggs are batched; the nests burst, and the insects find their way out of the earth. They assist each other with indefatigable industry in rolling these globular pellets to the place where they are to be buried. This they are to perform with the tail foremost, by raising up their binder part, and shoving along the ball with their hind-feet.* They are always accompanied with other beetles of a larger size, and of a more elegant structure and colour. The breast of this is covered with a shield of a crimson colour, and shining like metal; the head is of the like colour, mixed with green, and on the crown of the head stands a shining black horn, bended backwards. These are called the kings of the beetles, but for what reason is uncertain, since they partake of the same dirty drudgery with the rest.

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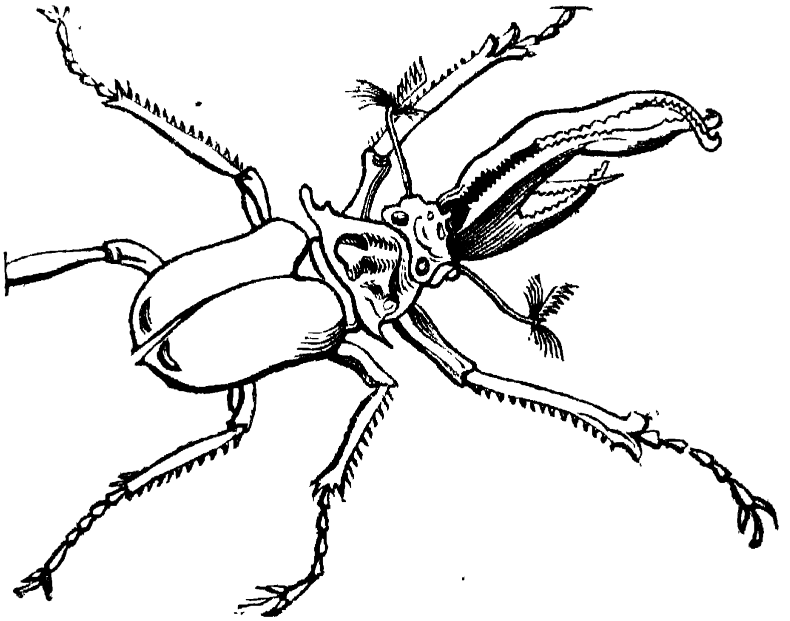
* INTESTINAL INSECTS: CURIOUS FACT.—That insects are, in some rare cases, introduced into the human stomach, has been more than once proved; though the greater number of the accounts of such facts in medical books are too inaccurate to be trusted. But one extraordinary case has been completely authenticated, both by medical men and competent naturalists; and is published in the Dublin Transactions, by Dr. Pickells, of Cork. Mary Riordan, aged 28, had been much affected by the death of her mother, and at one of her many visits to the grave seems to have partially lost her senses, having been found lying there on the morning of a winter's day, and having been exposed to heavy rain during the night. When she was about fifteen, two popular Catholic priests had died, and she was told by some old women that if she would drink daily, for a certain time, a quantity of water, mixed with clay taken from their graves, she would be for ever secure from disease and sin. Following this absurd and disgusting prescription, she took from time to time large quantities of the draught; some time afterwards, being affected with a burning pain in the stomach (*cardialgia*), she began to eat large pieces of chalk, which she sometimes also mixed with water and drank.

Now, whether in any or in all of these draughts she swallowed the eggs of insects, cannot be affirmed; but for several years she continued to throw up incredible numbers of grubs and maggots, chiefly of the churchyard beetle (*blaps mortisaga*, Fabr.). "Of the larvæ of the beetle," says Dr. Pickells, "I am sure I considerably under-rate, when I say that not less than 700 have been thrown up from the stomach at different times since the commencement of my attendance. A great proportion were destroyed by herself to avoid publicity; many, too, escaped immediately by running into holes in the floor. Upwards of ninety were submitted to Dr. Thomson's examination; nearly all of which, including two of the specimens of the meal-worm (*tenebrio molitor*), I saw myself, thrown up at different times. The average size was about an inch and a half in length, and four lines and a half in girth. The larvæ of the dipterous insect, though voided only about seven or eight times, according to her account, came up almost literally in myriads. They were alive and moving." Altogether, Dr. Pickells saw nearly 2,000 grubs of the beetle, and there were many which he did not see. Mr. Clear, an intelligent entomologist of Cork, kept some of them alive for more than twelve months. Mr. S. Cooper cannot understand whence the continued supply of the grubs was provided, seeing that larvæ do not propagate, and that only one pupa and one perfect insect were voided; but the simple fact that most beetles live several years in the state of larvæ sufficiently accounts for this. Their existing and thriving in the stomach, too, will appear less wonderful from the fact that it is exceedingly difficult to kill this insect; for Mr. Henry Baker repeatedly plunged one into spirits of wine, so fatal to most insects, but it revived, even after being immersed a whole night, and afterwards lived three years.

That there was no deception on the part of the woman, is proved by the fact that she was always anxious to conceal the circumstance; and that it was only by accident that the medical gentlemen, Drs. Pickells, Herrick, and Thomson, discovered it. Moreover, it does not appear that, though poor, she ever took advantage of it to extort money. It is interesting to learn that by means of turpentine, in large doses, she was at length cured. —INSECT TRANSFORMATIONS.


(The Stag Beetle.†)

The Elephant Beetle is the largest of this kind hitherto known, and is found in South America, particularly Guinea and Surinam, as well as about the river Oroonoko. It is of a black colour, and the whole body is covered with a very hard shell, full as thick and as strong as that of a small crab. Its length, from the hinder part to the eyes, is almost four inches, and from the same part to the end of the proboscis, or trunk, four inches and three quarters. The transverse diameter of the body is two inches and a quarter, and the breadth of each elytron, or case for the wings, is an inch and three tenths. The antennæ, or feelers, are quite horny; for which reason the proboscis or trunk is movable at its insertion into the head, and seems to supply the place of feelers. The horns are eight-tenths of an inch long, and terminate in points. The proboscis is an inch and a quarter long, and turns upwards, making a crooked line, terminating in two horns, each of which is near a quarter of an inch long; but they are not perforated at the end like the proboscis of other in-

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* **Tumble Dung Beetle.**—We are further informed, that they find out their subsistence by the excellency of their noses, which direct them in their flight to newly-fallen dung, on which they immediately go to work, tempering it with a proper mixture of earth. So intent are they always upon their employment, that, though handled or otherwise interrupted, they are not to be deterred, but immediately on being freed, persist in their work without any apprehension of danger. They are said to be so exceedingly strong and active as to move about, with the greatest ease, things that are many times their own weight. Dr. Brichell was supping one evening in a planter's house of North Carolina, when two of them were conveyed, without his knowledge, under the candlestick. A few blows were struck on the table, and, to his great surprise, the candlesticks began to move about, apparently without any agency; and his surprise was not much lessened when, on taking one of them up, he discovered that it was only a chafer that moved. — Insect Architecture.

† **Stag Beetle** (*Chiasognathus Grantii*).—It is figured and described at some length in the *Cambridge Philosophical Transactions*

for 1831, by J. F. Stephens, F.L.S. The annexed outline is two-thirds of the natural size, omitting a portion of two of the limbs rather than lessening the effect of the object by further reducing the size of the figure. This genus, as interesting from its structure, as it is remarkable for its splendour and colouring, belongs to the family of stag-beetles, lucanidæ. The specimen here figured was given to Dr. Grant by a native of South America, who informed him that he found it on a resinous shrubby plant, in the island of Chiloe, which is separated from the main land at Valparaiso by a very narrow channel. Mr. Stephens observes:—"The golden bronze upon the elytra, the burnished golden green of the raised centre of the thorax, and the varying colours of its sides and of the lateral spines, together form an assemblage of tints exceeding in intensity every thing which I have hitherto met with in entomology. In the structure of many of its organs, equally striking peculiarities present themselves. The spines which arm the hinder margins of the thorax, and the whorl of hairs at the tip of the long basal joint of the antennæ, are characters which we look for in vain amongst the known genera of lucanidæ," or stag-beetles. Again, the shield-like part of the head, the distinct existence of four eyes; the great strength of the fore-legs, the extraordinarily long antennæ, and the whorl of hairs which ornament their tips, (for Mr. Stephens cannot imagine of what service they can be to the animal,) are all characters of a very interesting kind. "But it is in the structure of the mouth that the entomologist will derive the greatest interest. The upper jaws, or mandibles, (which, in our common powerful stag-beetle, are scarcely longer than the head and thorax,) here acquire the length of the whole body; but, although they are very strong, and evidently capable of biting very sharply at their base, towards the middle they become flattened, and at the tip they are deflexed and incurved, crossing over each other, so that this portion of the jaws can scarcely be of much service to the insect, when employed in the ordinary use of mandibles. Their very tips are also bent backwards; and here again we are at a loss to imagine for what purpose this last peculiarity has been bestowed upon the animal, since we can scarcely imagine (as a celebrated French entomologist has done respecting the hooks of the antennæ of certain other beetles,) that they are for the purpose of enabling this insect to suspend itself from the twigs of trees when asleep. On examining the jaws of the stag-beetle, we externally perceive a tubercle as its base, which, in this new insect is greatly developed into an additional pair of lower horns similarly crossing each other, and furnished along their edge with short spines.

"The upper lip is very distinct, being composed of a pocket-shaped leathery plate, with a strong rib down the centre. The terminal portion of the lower jaws is very long, delicate, and fringed with very slender hairs. The food of the stag-beetles consists of the flowing sap of decaying trees, which is lapped up in the typical genera by the terminal plates of these lower jaws, and of the lower lip; but in this insect a difficulty appears to exist, from the very arched form of the upper jaws; since it is impossible for it, when standing upon the trunk of a tree, to apply these fine terminal plates to the tree, so as to collect the sap, without opening the jaws very wide. A similar difficulty exists in a mammalious animal, the giraffe; the singularly awkward position of which, when feeding from the ground, is well known. The case is not, however, exactly parallel, since the situation of the natural food of the giraffe does not require such an extraordinary exertion; whereas, in this insect there appears no other manner of avoiding the difficulty, from the natural situation of its food."

These are, probably, the most interesting of Mr. Stephens's details of the structure of this curious creature: though the remainder of the paper will be acceptable to the professed naturalist, it can scarcely be appreciable by the reader who is unaccustomed to technicalities. The specimen here figured is a male; "the female, when discovered, will doubtless be found to possess short jaws, and the club of the antennæ" is shorter.

sects. About four-tenths of an inch above the head, or that side next the body, is a prominence, or small horn, which, if the rest of the trunk were away, would cause this part to resemble the horn of a rhinoceros. There is, indeed, a beetle so called; but then the horns or trunk has no fork at the end, though the lower horn resembles this. The feet are all forked at the end, but not like lobsters' claws.*

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* Water Beetles.—From this numerous class we select the British hydrophilus, or water devil, of which the accompanying cuts give the natural size, and magnified. Its popular name bespeaks its savage propensities; and in examining its peculiar structure and habits, the faculty which most strikingly attracts our attention, is its ferocious disposition, and the fitness of its organs for the exercise of its ravenous appetite. It may safely be asserted, that no known species of larva is provided with weapons of destruction so powerful, so numerous, and well adapted to their end, as those which this creature possesses. It measures, when at maturity, an inch and a half in length, while the superior strength and courage manifested in its attacks on small fish, and other animals larger than itself, is truly surprising. Indeed, its natural history and economy, from the perspicuous pen of Mr. Pritchard, will be read with extreme interest.

About the latter end of April, and during the month of May, small nests of these insects are often found floating among the weeds and water-plants, in stagnant pools. They are in the form of balls, of a dusky white colour, and a silky texture, and have each a small stem of the same nature as the nest, by means of which it is attached to the roots or stalks of weeds at the bottom of the water. In this situation it remains during the winter, and is thus effectually preserved from the effects of intense cold. Early in the spring, the stem or cable to which we have referred, is detached from the weeds, by the winds which at that time prevail, and the nest rises to the surface of the water, and there floating, imbibes the genial influence of the sun. These nests may be taken and placed in a basin of water, and, as the season advances, hatched by the heat of the sun. On the larvæ leaving the nest, which they accomplish by gnawing a hole in the side, the infant larva immediately descends to the bottom of the vessel, with its jaws extended in search of prey, and eagerly devours all the small aquatic insects that are within its reach: if, however, there is a scarcity of food in the immediate neighbourhood of the nest, the larva of the same brood may be seen to devour each other.

In its infant state, this larva is very transparent: hence its internal structure may be clearly distinguished. The circulation along the principal artery on each side of the body can be distinctly observed.

The manner in which this larva treats its prey, evinces an extraordinary degree of instinct. Many of the creatures on which it feeds, are crustaceous about the head and back; hence their most vulnerable part is the belly. This part, therefore, the larva attacks, and to accomplish its aim, swims underneath the intended victim, and bending back its head, which is even with the surface of its back, is enabled to reach its prey by means of its jointed antennæ, 1, (in the cut) which represents a magnified view of the larva taken while young. Its next operation is to pierce it with the mandibles, 2. Having thus secured its object, it immediately ascends to the top of the water, and holding its prey above the surface, so as to prevent it struggling, shakes it as a dog would a rat. The prey, however, of this larva, is often larger than its destroyer. Its next operation is to insert the piercer and sucker, 4, which is capable of being thrust out or withdrawn at pleasure. When the juices of the victim are not easily procured by suction or exhaustion, the serrated pair of forceps, 3, is employed to tear and masticate it, and thus cause the juices to be more easily obtained. If its food is plentiful, this larva arrives at its full growth in the course of three or four weeks, and is then nearly opaque, and thickly covered with hair. It can be kept several days without food, and by this exinanition its structure becomes considerably more transparent, while its natural ferocity is greatly increased, so that it will attack and fight with creatures much larger than itself, and even with its own species.

On a fine sunny day the larvæ arise to the surface of the water, and delight to bask in the sun, but if watched, they remain motionless, with their claws extended. If a stick, or any other substance, be presented to them, they will immediately seize it, and will sometimes suffer themselves to be cut into pieces before they relinquish their hold. Their bite has been considered poisonous by many persons, as it takes a greater length of time to heal than other wounds of the same extent, so that caution should be used in taking them.

Touching the anatomy of this creature, it may be observed, that the sucker, marked 4, is contained in a crustaceous sheath, and may be considerably protruded or completely withdrawn at the pleasure of the larva: in the cut it is shown extended. The eyes are compound, but of a peculiar conformation, being

To this class we may also refer the glow-worm, that little animal which makes such a distinguished figure in the descriptions of our poets. No two insects can differ more than the male and female of this species from each other. The male is in every respect a beetle, having cases to its wings, and rising in the air at pleasure; the female, on the contrary, has none, but is entirely a creeping insect, and is obliged to wait the approaches of her capricious companion. The body of the female has eleven joints, with a shield breast-plate, the shape of which is oval; the head is placed over this, and is very small, and the three last joints of her body are of a yellowish colour: but what distinguishes it from all other animals, at least in this part of the world, is the shining light which it emits by night, and which is supposed by some philosophers to be an emanation which she sends forth to allure the male to her company.* Most travellers who have gone through sandy countries must well remember the little shining sparks with which the ditches are studded on each side of the road.† If incited by

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composed of seven oval lenses, arranged like leaves upon a branch; in the drawing they are denoted by the figure 5. The whole of the head and thorax is curiously marked with a number of lines and spots. The legs are six in number; they are thickly set with rows of hair on their opposite sides, and each is furnished with a sharp claw. The number of swimmers on each side is seven; they are covered with hairs, and, in the specimen from which the drawing was taken, a vast number of *vorticella*, or bell polypi, were attached. These will be recognised in the magnified drawing by their bell-shaped figure. They sometimes infest this species of larva to such a degree, as considerably to impede its motions in swimming. On each side of the abdomen, which commences near the origin of the first pair of brachia, or swimmers, arise the great vessels; the two are probably united near the tail, where an exceedingly curious process is also distinctly exhibited. The whole surface of the body is thickly covered with hairs, and several tufts are disposed in clusters, with some regularity down the back and sides. The flexible pulsatory organ, in perpetual motion, is distinctly shown. Its form resembles the letter S, inverted. The use of the curious appendages at the lower extremity of the body is unknown. Its tail is biforked and crustaceous. As the larva approaches maturity, it casts its skin several times, from each of which it escapes by a rent formed down the back.

After this creature has remained for a considerable time in the larva state, it buries itself in a hole, which it forms for that purpose near the edge of the water, and after passing through the chrysalis state, it emerges in the form of a perfect beetle. Several species of this genus have been described by different naturalists, particularly by Dr. Turton; but the precise characteristics of the perfect insect which is produced from this identical species of larva, are at present unknown: it will be recollected, however, that this circumstance does not render it a whit less valuable as a microscopic object.

* The male glow-worm yields light as well as the female, but much fainter. The eggs are also, in some degree, luminous. The light, which the worm has power to extinguish at pleasure, proceeds from brilliant spots on the three last rings of the body, and on the tail; the luminous matter is a yellow substance contained in the vesecles, and when these vesecles are removed entire, they shine for some time afterwards; but if lacerated, they are extinguished.—Ed.

The common doctrine respecting the light of the glow-worm is, that it is a lamp, lit up by the female to direct the darkling flight of the male. This proves to be a fallacy. The author of *The Journal of a Naturalist*, refining upon this notion, conjectures that the peculiar conformation of the head of the male glow-worm is intended as a converging reflector of the light of the female, "always beneath him on the earth." "As we commonly," he adds, "and with advantage, place our hand over the brow, to obstruct the rays of light falling from above, which enables us to see clearer an object on the ground, so must the projecting hood of this creature converge the visual rays to a point beneath."

Upon this Mr. Rennie observes, "Unfortunately for this theory, the grubs—which, being in a state of infancy, are therefore incapable of propagating—exhibit a no less brilliant light than the perfect insect. De Geer says the light of the grub was paler, but in the one which I had it was not so. He also remarked the same light in the nymph state, which he describes as 'very lively and brilliant;' and, in this stage of existence, it is still less capable of propagating than in that of larva. 'Of what use then,' he asks, 'is the light displayed by the glow-worm? It must serve some purpose yet unknown. The authors who have spoken of the male glow-worms say positively that they shine in the dark as well as the females.' These plain facts appear completely to extinguish the poetical theory."

† GLOW-WORMS' LIGHT.—By observing

curiosity to approach more nearly, he will find the light sent forth by the glow worm; if he should keep the little animal for some time, its light continues to grow paler, and at last appears totally extinct. The manner in which this light is produced has hitherto continued inexplicable; it is probable the little animal is supplied with some electrical powers, so that by rubbing the joints of its body against each other, it thus supplies a stream of light which, if it allures the male, as we are told, serves for very useful purposes.

The Cantharis is of the beetle kind, from whence come cantharides, well known in the shops by the name of Spanish flies, and for their use in blisters. They have feelers like bristles, flexible cases to the wings, a breast pretty plain, and the sides of the belly wrinkled. Cantharides differ from each other in their size, shape, and colour; those used in the shops also do the same. The largest in these parts are about an inch long, and as much in circumference, but others are not above three-quarters of an inch. Some are of a pure azure colour, others of pure gold, and others, again, have a mixture of pure gold and azure colours: but they are all very brilliant, and extremely beautiful. These insects, as is well known, are of the greatest benefit to mankind, making a part in many medicines conducive to human preservation. They are chiefly natives of Spain, Italy, and Portugal; but they are to be met with also about Paris in the summer time, upon the leaves of the ash, the poplar, and the rose trees, and also among wheat, and in meadows. It is very certain that these insects are fond of ash leaves, insomuch that they will sometimes strip one of these trees quite bare. Some affirm, that these flies delight in sweet-smelling herbs; and it is very certain that they are fond of honeysuckles, lilac, and wild-cherry shrubs; but some that have sought after them, declare they never could find them on elder trees, nut trees, and among wheat. We are told, that the country people expect the return of these insects every seven years. It is very certain, that such a number of these insects have been seen together in the air, that they appeared like swarms of bees; and that they have so disagreeable a smell, that it may be perceived a great way off, especially about sun-set, though they are not seen at that time. This bad smell is a guide for those who make it their business to catch them. When they are caught they dry them, after which they are so light, that fifty will hardly weigh a drachm. Those that gather them, tie them in a bag, or a piece of linen cloth, that has been well worn, and then they kill them with the vapours of hot vinegar, after which they dry them in the sun, and keep them in boxes. These flies, thus dried, being chemically analyzed, yield a great deal of volatile caustic-salt, mixed with a little oil, phlegm, and earth. Cantharides are penetrating, corrosive, and, applied to the skin, raise blisters, from whence proceeds a great deal of serosity. They are made use of both inwardly and outwardly. However, it is somewhat strange that the effects of these flies should fall principally upon the urinary passages; for though some authors have endeavoured to account for this, we are still in the dark, for all they have said amounts to no more, than that they affect these parts in a manner which may be very learnedly described, but very obscurely comprehended.

An insect of great, though, perhaps, not equal use in medicine, is that which is known by the name of the Kermes; it is produced in the excrescence of an oak, called the berry-bearing ilex, and appears at first wrapt up in a membranaceous bladder, of the size of a pea, smooth and shining, of a brownish red colour, and covered with a very fine ash-coloured powder. This bag teems with a number of reddish eggs, or insects, which being rubbed with the fingers, pour out a crimson liquor. It is only met with in warm countries in the months of May and June. In the month of April this insect becomes of the size and shape of a pea, and its eggs some time after burst from the womb, and soon turning worms, run about the branches and leaves of the tree. They are of two sexes, and the females have been hitherto described; but the males are very distinct

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two glow-worms which were brought from the field to the bank in the garden, it appeared to us that these little creatures put out their lamps between eleven and twelve, and shone no more for the rest of the night. —Nat. Hist. of Selborne.

from the former, and are a sort of small flies, like gnats, with six feet, of which the four forward are short, and the two backward long, divided into four joints, and armed with three crooked nails. There are two feelers on the head, a line and a half long, which are movable, streaked, and articulated. The tail, at the back part of the body, is half a line long, and forked. The whole body is covered with two transparent wings, and they leap about in the manner of fleas. The harvest of the kermes is greater or less in proportion to the severity of the winter, and the women gather them before sun-rising, tearing them off with their nails, for fear there should be any loss from the hatching of the insects. They sprinkle them with vinegar, and lay them in the sun to dry, where they acquire a red colour.

(Cochineal Insects.)

An insect, perhaps, still more useful than either of the former, is the Cochineal, which has been very variously described by authors; some have supposed it a vegetable excrescence from the tree upon which it is found; some have described it as a louse, some as a bug, and some as a beetle.* As they appear in our shops when brought from America, they are of an irregular shape, convex on one side, and a little concave on the other; but are both marked with transverse streaks, or wrinkles. They are of a scarlet colour within, and without of a blackish red, and sometimes of a white, reddish, or ash-colour, which are accounted the best, and are brought to us from Mexico. The cochineal insect is of an oval form, of the size of a small pea, with six feet, and a snout, or trunk. It brings forth its young alive, and is nourished by sucking the juice of the plant. Its body consists of several rings, and when it is once fixed on the plant, it continues immovable, being subject to no change. Some pretend there are two sorts, the one domestic, which is best, and the other wild, that is of a vivid colour; however, they appear to be the same, only with this difference, that the wild feeds upon uncultivated trees, without any assistance, whereas the domestic is carefully, at a stated season, removed

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* Manufacture of Cochineal at Rio de Janeiro.—It is supposed, that the insect which forms this dye at Rio, is not the same as that noticed by Linnæus, under the name of *coccus cacti coccinellifera*, which is described as being flat on the back, with black legs, and tapering horns, or *antennæ*.

The insect of Rio is convex, with legs, six in number, of a clear, bright red, in both male and female, and the *antennæ moniliform*, or beadlike. The colour of the whole body of the male is a bright red; the breast elliptical, and slightly attached to the head: the *antennæ* about half as long as the body. Two fine white filaments, thrice as long as the insect, project from its abdomen; and they have two wings, erect, of a faint straw colour. The female, which has no wings, is of an elliptic form, and convex on both sides; its back is covered with a downy substance, resembling fine cotton. The abdomen is marked with transverse *rugæ*, or furrows. The mouth is situated in the breast, having a brownish beak, which penetrates the plant the insect feeds upon. About twenty days after its birth it becomes pregnant; and dies after bringing forth an innumerable offspring. The size of these are so minute, as to be easily mistaken for the eggs of those insects: they remain without the least appearance of life for about the space of a day, then show tokens of animation, and soon after, move agilely over the surface of the leaf, upon which they were deposited by the mother. In three or four days the downy envelopement, visible on the second day only through a microscope, appears to the naked eye; and the insect it covered increases rapidly in size till equal to a grain of rice. As they augment in bulk, they decrease in moto cultivated trees, where it feeds upon a purer juice. Those who take care of these insects, place them on the prickly pear-plant in a certain order, and are very industrious in defending them from other insects; for if any other kind come among them, they take care to brush them off with foxes' tails. Towards the end of the year, when the rains and cold weather are coming on, which are fatal to these insects, they take off the leaves or branches covered with cochineal, that have not attained their utmost degree of perfection, and keep them in their houses till winter is past. These leaves are very thick and juicy, and supply them with sufficient nourishment while they remain within doors. When the milder weather returns, and these animals are about to exclude their young, the natives make them nests, like those of birds, but less, of tree moss, or soft hay, or the down of cocoa nuts, placing twelve in every nest. These they fix on the thorns of the prickly pear-plant, and in three or four days' time they bring forth their young, which leave their nests in a few days, and creep upon the branches of the plant, till they find a proper place to rest in, and take in their nourishment; and until the females are fecundated by the males, which, as in the former tribe, differ very widely, from the females being winged insects, whereas the others only creep, and are at most stationary. When they are impregnated, they produce a new offspring, so that the propagator has a new harvest thrice a year. When the native Americans have gathered the cochineal, they put them into holes in the ground, where they kill them with boiling water, and afterwards dry them in the sun, or in an oven, or lay them upon hot plates. From the various methods of killing them, arise the different colours which they appear in when brought to us. While they are living, they seem to be sprinkled over with a white powder, which they lose as soon as the boiling water is poured upon them. Those that are dried upon hot places are the blackest. What we

tion; and when arrived at full growth, they are attached to the leaf in a torpid state. This is the period at which they are taken from the plant for use: if suffered to remain, they would deposit their young, as before mentioned. Various cells, of a cylindric form, standing perpendicularly upon the surface of the leaf, are discovered among the clusters of these insects, enveloped in their cotton. These cells are the crysalides, or coccoons, of the male. The wings, in their nascent state, make their first appearance out of them, and are perceptible about three days before the insect is in a state of completion, or maturity. In that condition it enjoys its existence only three or four days, during which it impregnates the females.

The plant upon which this insect feeds, is the *cactus opuntia* of Linnæus; called at Rio, *orumbela*—a species of the *cactus*, or prickly pear.

The leaves of this plant are somewhat elliptical, and grow without stalks. They are thick and fleshy, having the upper side more planoconcave than the other. They rise immediately one from the other's edge, and also from the stem, armed with round and tapering prickles about an inch long. These plants, though they would extend to twenty, are prevented from rising above eight feet; this height being more convenient to the manufacturer, and at which the juice of the leaves is supposed most nutricious. The young leaves are of a darkish green, but acquire, by age, a yellow cast; and their internal substance is of the same colour as the external.

Upon the *cactus* is found another insect, supposed to feed upon the *coccus*, or *cochineal* insect It resembles, in its perfect state, a four-winged insect, called *ichneumon*; but is found, on close examination, to be a fly with only two wings. The larva, or caterpillar of this fly, is with difficulty distinguished from the *coccus*; it insinuates itself into the cotton in which the latter is enveloped When this fly is prepared to change its skin, it leaves the cotton, comes upon the leaf, and quickly increases in size, and changes its colour. In a few days, then it becomes inactive; but quickly after, it contracts its wings with violent agitation, and deposits a globule of pure red colouring matter. It next suspends itself upon the prickles of the leaf, and is metamorphosed into a chrysalis, out of which issues shortly a perfect fly.

The conversion of the insects into *cochineal* is a simple process. They are put into a flat earthen dish, and placed, alive, over a charcoal fire, and pan-roasted very slowly, till the down upon them disappears, and the aqueous juice of the animal be entirely evaporated. But, during this process, they are to be constantly stirred about, with a tin ladle, to prevent absolute torrefaction, which would reduce the insect to ashes, and therefore destroy the colour.—CORRESPONDENT OF THE MIRROR.

call the cochineal are only the females, for the males are a sort of fly, as already observed, in the kermes. They are used both for dyeing and medicine, and are said to have much the same virtue as the kermes, though they are now seldom used alone, but are mixed with other things for the sake of the colour.*

I shall end this account of the beetle tribe with the history of an animal which cannot properly be ranked under this species, and yet which cannot be more methodically ranged under any other. This is the insect that forms and resides in the gall-nut, the spoils of which are converted to such useful purposes. The gall insects are bred in a sort of bodies adhering to a kind of oak, in Asia, which differ with regard to their colour, size, roughness, smoothness, and shape, and which we call galls. They are not fruit, as some have imagined, but preternatural tumours, owing to the wounds given to the buds, leaves, and twigs of the tree, by a kind of insects that lay their eggs within them. This animal is furnished with an implement, by which the female penetrates into the bark of the tree, or into that spot which just begins to bud, and there sheds a drop of corrosive fluid into the cavity. Having thus formed a receptacle for her eggs, she deposits them in the place, and dies soon after. The heart of the bud being thus wounded, the circulation of the nutritive juice is interrupted, and the fermentation thereof, with the poison injected by the fly, burns the parts adjacent, and then alters the natural colour of the plant. The juice, or sap, turned back from its natural course, extravasates and flows round the egg; after which it swells and dilates by the assistance of some bubbles of air, which get admission through the pores of the bark, and which run in the vessels with the sap. The external coat of this excrescence is dried by the air, and grows into a figure which bears some resemblance to the bow of an arch, or the roundness of a kernel. This little ball receives its nutriment, growth, and vegetation, as the other parts of the tree, by slow degrees, and is what we call the gall-nut. The worm that is hatched under this spacious vault, finds in the substance of the ball, which is as yet very tender, a subsistence suitable to its nature; gnaws and digests it till the time comes for its transformation to a nymph, and from that state of existence changes into a fly. After this, the insect, perceiving itself duly provided with all things requisite, disengages itself soon from its confinement, and takes its flight into the open air.* The case, however, is not similar with respect to the gall-nut that grows in autumn. The cold weather frequently comes on before the worm is transformed into a fly, or before the fly can pierce through its inclosure. The nut falls with the leaves, and although you may imagine that the fly which lies within is lost, yet in reality it is not so; on the contrary, its being covered up so close is the means of its preservation. Thus it spends the winter in a warm house, where every crack and cranny of the nut is well stopped up; and lies buried, as it were, under a heap of leaves, which preserves it from the injuries of the weather. This apartment, however, though so commodious a retreat in the winter, is a perfect prison in the spring. The fly, roused out of its lethargy by the first heats, breaks its way through, and ranges where it pleases. A very small aperture is sufficient, since at this time the fly is but a diminutive creature. Besides, the ringlets whereof its body is composed, dilate, and become pliant in the passage.†

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* SPECIES OF COCHINEAL INCIDENTAL TO GREAT BRITAIN.—The Rev. Gilbert White, in a letter to Daines Barrington, says, "As I have sometimes known you make inquiries about several kinds of insects, I shall here send you an account of one sort which I little expected to have found in this kingdom. I had often observed that one particular part of a vine, growing on the walls of my house, was covered in the autumn with a black, dust-like appearance, on which the flies fed eagerly; and that the shoots and leaves thus affected did not thrive, nor did the fruit ripen. To this substance I applied my glasses, but could not discover that it had any thing to do with animal life, as I at first expected; but upon a closer examination behind the larger boughs, we were surprised to find that they were coated over with husky shells, from whose sides proceeded a cotton-like substance, surrounding a multitude of eggs. This curious and uncommon production put me upon recollecting what I have heard and read concerning the *coccus vitis viniferæ* of Linnæus, which, in the south of Europe, infests many vines, and is a horrid and loathsome pest. As soon as I had turned to the accounts given of this insect, I saw at once that it swarmed on my vine: and did not appear to have been at all checked by the preceding winter, which had been uncommonly severe.

"Not being then at all aware that it had any thing to do with England, I was much inclined to think that it came from Gibraltar, among the many boxes and packages of plants and birds which I had formerly received from thence; and especially as the vine infested grew immediately under my study window, where I usually kept my specimens. True it is, that I had received nothing from thence for some years: but as insects, we know, are conveyed from one country to another in a very unexpected manner, and have a wonderful power of maintaining their existence till they fall into a *nidus* proper for their support and increase, I cannot but suspect still that these *cocci* came to me originally from Andalusia. Yet, all the while, candour obliges me to confess, that Mr. Lightfoot has written me word, that he once, and but once, saw these insects on a vine at Weymouth, in Dorsetshire; which, it is here to be observed, is a seaport town, to which the *coccus* might be conveyed by shipping."

Most of the species of *coccus*, which are found in and infest the green-houses and conservatories of Britain, have been introduced with exotic plants. They are now very common in this country, and are a very prolific race. The females fix themselves, and tenaciously and immovably adhere, to the branches of plants. Some of them lose entirely the form of insects: their bodies swell, their skin stretches, and becomes smooth, and they so closely resemble some of the galls, or excrescences, found on plants, as to be taken for such by people unacquainted with the subject. After this change, the abdomen serves only as a kind of shell, or covering, under which the eggs are concealed. Others, although they are also thus fixed, preserve their insect form till they have laid their eggs, and then die. A kind of downy substance grows on their abdomen, which serves for the formation of the nest, in which they deposit their eggs.

The males differ considerably from the females, being provided with wings, and are small, but very active insects. It is from one of this tribe, the *coccus cacti*, or American cochineal, that the celebrated red dye called cochineal is made.—NATURAL HISTORY OF SELBORNE.

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* GALL INSECT.—The above seems to be the received doctrine of the propagation of this insect, at present, in France. Mr. Rennie observes, "Without pretending positively to state facts which are, perhaps, beyond human penetration, we may view the process in a rather different light. Following the analogy of what is *known* to occur in the case of the saw-flies, after the gall-fly has made a puncture and pushed her egg into the hole, we may suppose that she covers it over with some adhesive gluten, or gum, or the egg itself, as is usual among moths, &c., may be coated over with such a gluten. In either of these two cases, the gluten will prevent the sap that flows through the puncture from being scattered over the leaf and wasted; and the sap, being thus confined to the space occupied by the eggs, will expand and force outwards the pellicle of gluten that confines it, till becoming thickened by evaporation and exposure to the air, it at length shuts up the puncture, stops the further escape of the sap, and the process is completed. This explanation will completely account for the globular form of the galls alluded to; that is, supposing the egg of the gall-fly to be globular, and covered, or coated, with a pellicle of gluten of uniform thickness, and consequently opposing uniform resistance, or rather uniform expansibility, to the sap pressing from within. It will also account for the remarkable uniformity in the size of the gall apples; for the punctures and the eggs being uniform in size, and the gluten, by supposition, uniform in quantity, no more than the same quantity of sap can escape in such circumstances.

"But though this explanation appears to be plausible, it is confessedly altogether conjectural; for nobody since Swammerdam, so far as we at present know, has ever detected a gall-fly in the act of depositing her eggs, and he did not attend to this circumstance. The indefatigable Réaumur, on one occasion, thought he would make sure of tracing the steps of the process in the case of the gall-fly, which produces the *bedeguar* on the wild-rose tree. His plan was to inclose in a box, in which a brood of flies had just been produced from a bedeguar, a living branch from a wild-rose tree; but, to his great disappointment, no eggs were laid, and no bedeguar formed. Upon further investigation, he discovered that the brood of flies produced from the bedeguar were not the genuine bedeguar insects at all, but one of the parasite ichneumons (*Callimone Bedeguaris*, Stephens), which had surreptitiously deposited their eggs there, in order to supply their young with the bedeguar grubs, all of which they appeared to have devoured."—INSECT ARC.

† INSECTS WHICH INFEST THE SUGAR-CANE.—To these insects may be referred the accompanying batch, which are interesting from their connexion with an article of such importance as sugar. The sugar-cane has many enemies. Among them, naturalists enumerate the large fire-fly, an undetermined aphis (plant louse), and the jumper-fly; all

CHAP. VII.

THE GNAT AND THE TIPULA.

There are two insects which entirely resemble each other in their form, and yet widely differ in their habits, manners, and propagation. Those who have seen the tipula, or long-legs, and the larger kind of gnat, have most probably mistaken the one for the other; they have often accused the tipula, a harmless insect, of depredations made by the gnat, and the innocent have suffered for the guilty; indeed, the differences in their form are so very minute, that it often requires the assistance of a microscope to distinguish the one from the other: they are both mounted on long legs, both furnished with two wings and a slender body; their heads are large, and they seem to be hump-backed; the chief and only difference, therefore, is, that the tipula wants a trunk, while the

of which are said to be bred in the cane. The myriads of ants which once infested, but have now disappeared from, Grenada, committed, indeed, the most frightful ravages; but it was rather by excavating their little metropolis beneath the roots, than by attacking the body of the cane.

Among the most frequent and formidable enemies is the palm weevil (*calandra palmarum*), of which Fig. 1, is the female creeping; and Fig. 2, the male. This insect is principally injurious to the plants lately stuck in the ground, to which the female is allured by the juices which are exuded. These they sometimes attack so vigorously, that a fresh planting becomes necessary. They do not seem to deposit their eggs in full-grown canes, when palms are abundant in the neighbourhood.

Fig. 1.

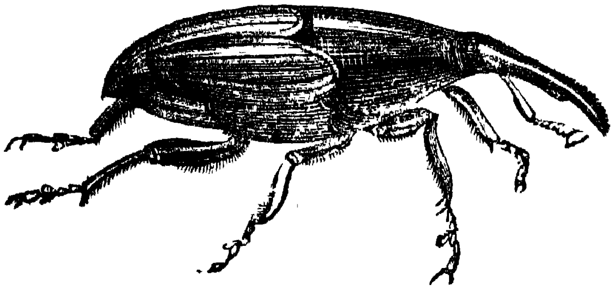


Fig. 3.

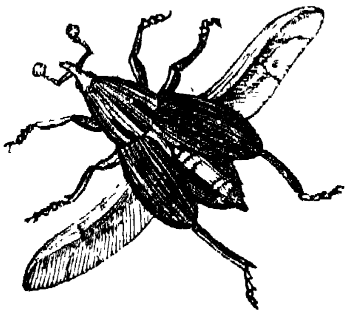


Fig. 2

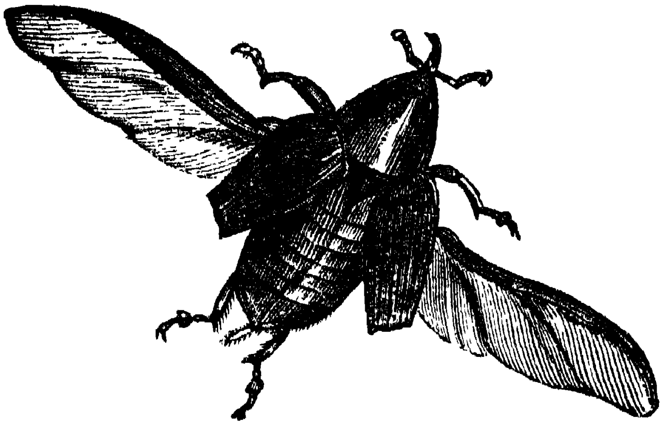
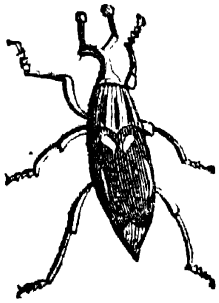


Fig. 4.



(Palm and Sugar Weevils.)

Another enemy is the sugar weevil (*calandra sacchari*), which confines itself principally to such canes as have been slightly injured; though it sometimes attacks the more vigorous plants, which it excavates to the very ground. Fig 3 is a specimen, and Fig 4 a variety of this insect.

gnat has a large one, which it often exerts to very mischievous purposes.* The tipula is a harmless, peaceful insect, that offers injury to nothing; the gnat is sanguinary and predaceous, ever seeking out for a place in which to bury its trunk, and pumping up the blood from the animal in large quantities.

But the most destructive and common enemy is the smaller grub of the borer moth sugar borer (*diatræa sacchari*), from which the sugar-cane is never exempt. Fortunately, in the seasonable climate of St. Vincent, from our improved cultivation, the animal is not very formidable; but, in some other of our colonies, which are subject to dry seasons, they have been known to blast the hopes of the year, to destroy whole acres of canes, and ruin the unfortunate planter. The borers are much more fatal to plant than ratoon canes: one of the latter will sometimes nourish several of the borer worms, which perforate every joint; when the pithy centre becoming discoloured and sour, not only fails to yield at the mill, but communicates a dark colour and bad quality to the syrup of the sounder plants. The Society of Arts has long offered rewards for the expulsion of these borers; but a competent writer on the subject thinks the object of the planter should be to prevent the insects from depositing eggs in the plants, rather than to kill those which have already begun their operations. Indeed, from long continued experiments, he has discovered, that they may be almost entirely expelled from any quarter in which the canes are carefully stripped of the dry and useless leaves, under which, as they become loose, the female borer deposits her eggs; and, were the ants less prolific than they are, we might encourage them as useful helpmates in the destruction of the borers, which they pursue and kill in their cylindrical labyrinths.

It is worthy of notice, that the grub of the palm weevil, which is the size of the thumb, has long been in request in both Indies. Ælian speaks of an Indian king, who, for a dessert, instead of fruit, set before his Grecian guests a roasted worm taken from a plant, probably the larva of this insect, which, he says, the Indians esteem very delicious; a character that was confirmed by some of the Greeks who tasted it. Madame Merian says, that the natives of Surinam roast and eat these grubs as something very exquisite; and, says Mr. Kirby, "a friend of mine, who has resided a good deal in the West Indies, where the palm grub is called Grugru, informs me, that the late Sir John La Forey, who was somewhat of an epicure, was extremely fond of it when properly cooked."—Magazine of Natural Hist.

* Injuries Committed by the Tipulidæ. — The maggots of this family which seem to do most injury, are those of *Tipula oleracea*, and *T. cornicina*. In the summer of 1828, we observed more than an acre of ground, adjoining the Bishop of Oxford's garden, at Blackheath, as entirely stripped, both of grass and every thing green, as if the turf had been pared off from the surface, the only plant untouched being the tiny bird tare (*Ornithopus perpusillus*). On digging here to learn the cause, we found these larvæ already full-fed, and about to pass into pupæ, after having left nothing upon which they could subsist. It was not a little remarkable that they seemed to be altogether confined to this spot; for we did not meet with a single foot of turf destroyed by them in any other part of the heath, or in the adjacent fields. So very complete, however, was their destruction of the roots on the spot in question, that even now, at the distance of two years, it is still visibly thinner of herbage than the parts around it.

Réaumur gives a similar account of their ravages in Poitou, where, in certain seasons, the grass of the low, moist meadows, has been so parched up in consequence, as not to afford sufficient provender for the cattle. He describes the soil in Poitou as a black peat mould; and it was the same in which we found them at Blackheath, with this difference, that the spot was elevated and d According to M. Réaumur, also, their only food is this sort of black mould, and not the roots of grass and herbage, which he thinks are only loosened by their burrowing. This view of the matter appears strongly corroborated by the fact, that several species of the family feed upon the mould in the holes of decaying trees, particularly the larva of a very beautiful one (*Ctenophora flaveolata*, Meigen), which is very rare in Britain. It is proper to mention, however, that Mr. Stickney's experiments, contrary to the conclusions of Réaumur, indicate that these larvæ devour the roots of grass; and Stewart says, they "feed on the roots of plants, corn, and grasses, and are thence destructive to gardens, fields, and meadows. They prevailed in the neighbourhood of Edinburgh, and other places in Scotland, in the spring of 1800, when they laid waste whole fields of oats and other grain."

In many districts of England these insects cut off a large proportion of the wheat crop, particularly, it would appear, when it had been sown on clover leys. "In the rich district," says Kirby and Spence, "of Sunk Island, in Holderness, in the spring of 1813, hundreds of acres of pasture have been entirely destroyed by them, being rendered as completely brown as if they had suffered a three months' drought, and destitute of all

The gnat proceeds from a little worm, which is usually seen at the bottom of standing waters. The manner in which the insect lays its eggs is particularly curious; after having laid the proper number on the surface of the water, it surrounds them with a kind of unctuous matter, which prevents them from sinking; but at the same time fastens them with a thread to the bottom, to prevent their floating away at the mercy of every breeze, from a place, the warmth of which is proper for their production, to any other, where the water may be too cold, or the animal's enemies too numerous. Thus the insects, in their egg state, resembles a buoy, which is fixed by an anchor. As they come to maturity they sink deeper, and at last, when they leave the egg as worms, they creep at the bottom. They now make themselves lodgments of cement, which they fasten to some solid body at the very bottom of the water, unless, by accident, they meet with a piece of chalk, which being of a soft and pliant nature, gives them an opportunity of sinking a retreat for themselves, where nothing but the claws of a cray-fish can possibly molest them. The worm afterwards changes its form. It appears with a large head, and a tail invested with hair, and moistened with an oleaginous liquor, which she makes use of as a cork, to sustain her head in the air, and her tail in the water, and to transport her from one place to another. When the oil with which her tail is moistened begins to grow dry, she discharges out of her mouth an unctuous humour, which she sheds all over her tail, by virtue whereof she is enabled to transport herself where she pleases, without being either wet or any ways incommoded by the water. The gnat, in her second state, is, properly speaking, in her form of a nymph, which is an introduction or entrance into a new life. In the first place, she divests herself of her second skin; in the next, she resigns her eyes, her antennæ, and her tail; in short, she actually seems to expire. However, from the spoils of the amphibious animal, a little winged insect cuts the air, whose every part is active to the last degree, and whose whole structure is the just object of our admiration. Its little head is adorned with a plume of feathers, and its whole body invested with scales and hair, to secure it from any wet or dust. She makes trial of the activity of her wings, by rubbing them either against her body or her broad side-bags, which keep her in an equilibrium. The furbelow, or little border of fine feathers, which graces her wings, is very curious, and strikes the eye in the most agreeable manner. There is nothing, however, of greater importance to the gnat than her trunk, and that weak implement may justly be deemed one of nature's master-pieces. It is so very small, that the extremity of it can scarcely be discerned through the best microscope that can be procured. That part which is at first obvious to the eye, is nothing but a long scaly sheath under the throat. At near the distance of two-thirds of it, there is an aperture, through which the insect darts out four stings, and afterwards retracts them. One of which, however sharp and active it may be, is no more than the case in which the other three lie concealed, and run in a long groove. The sides of these stings are sharpened like two-edged swords; they are likewise barbed, and have a vast number of cutting teeth towards the point, which turns up like a hook, and is fine beyond expression. When all these darts are stuck into the flesh of animals, sometimes one after another, and sometimes all at once, the blood and humours of the adjacent parts must unavoidably be extravasated; upon which a tumour must consequently ensue, the little orifice whereof is closed up by the compression of the external air. When the gnat, by the point of her case, which she makes use of as a tongue, has tasted any fruit, flesh, or juice that she has found out, if it be a fluid, she sucks it up, without playing her darts into it;

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vegetation except a few thistles. A square foot of the dead turf being dug up, 210 grubs were counted on it; and, what furnishes a striking proof of the prolific powers of those insects, last year it was difficult to find a single one."

It is worthy of remark, that the mandibles of these destructive creatures, which are claw-shaped and transverse, do not act against each other as is usual among insects, but against two other pieces which are immovable, convex, and toothed,—as if the under-jaw in quadrupeds were divided into two, and should act vertically on the two portions of the immovable upper-jaw thrown in between them.—Insect Transformations.

but in case she finds the least obstruction by any flesh whatever, she exerts her strength, and pierces through it, if possibly she can. After this she draws back her stings into their sheath, which she applies to the wound in order to extract, as through a reed, the juices which she finds inclosed.* This is the implement with which the gnat performs her work in the summer, for during the winter she has no manner of occasion for it. Then she ceases to eat, and spends all that tedious season either in quarries or in caverns, which she abandons at the return of summer, and flies about in search after some commodious ford, or standing water, where she may produce her progeny, which would be soon washed away and lost by the too rapid motion of any running stream. The little brood are sometimes so numerous, that the very water is tinged according to the colour of the species, as green, if they be green, and of a sanguine hue, if they be red.

These are circumstances sufficiently extraordinary in the life of this little animal, but it offers something still more curious in the method of its propagation. However similar insects of the gnat kind are in their appearance, yet they differ widely from each other in the manner in which they are brought forth, for some are oviparous, and are produced from eggs, some are viviparous, and come forth in their most perfect form; some are males, and unite with the female; some are females, requiring the impregnation of the male; some are of neither sex, yet still produce young, without any copulation whatsoever. This is one of the strangest discoveries in all natural history! A gnat separated from the rest of its kind, and inclosed in a glass vessel, with air sufficient to keep it alive, shall produce young, which also, when separated from each other, shall be the parents of a numerous progeny. Thus, down for five or six generations, do these extraordinary animals propagate without the use of copulation, without any congress between the male and female, but in the manner of vegetables, the young bursting from the body of their parents, without any previous impregnation. At the sixth generation, however, their propagation stops, the gnat no longer produces its like, from itself alone, but it requires the access of the male to give it another succession of fecundity.

The gnat of Europe gives but little uneasiness; it is sometimes heard to hum about our beds at night, and keeps off the approaches of sleep by the apprehen-

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* LARVÆ OF BLOW-FLIES.—The maggots or larvæ of the blow-flies are a destructive race to animal matter. Linnæus says, the *musca vomitaria* will devour the carcass of a horse as quickly as a lion would do. And this is not at all improbable, when we know that a species nearly allied to this (the *musca carnaria*) produces not fewer than twenty thousand at a time; and that they have been proved by Redi to increase in weight two hundred fold within the short space of twenty-four hours. One of the most extraordinary circumstances connected with the destructive powers of maggots, and of their attacking the human frame, is recorded in *Bell's Weekly Messenger*. "On the 25th of June, 1829, died at Asbornby, Lincolnshire, John Page, a pauper, belonging to Little Willoughby, under circumstances truly singular. He being of a restless disposition, and not choosing to stay in the parish workhouse, was in the habit of strolling about the neighbouring villages, subsisting on the pittance obtained from door to door; the support he usually received from the benevolent was bread and meat; and after satisfying the cravings of nature, it was his custom to deposit the surplus provisions, particularly the meat, betwixt his shirt and skin. Having a considerable portion of this provision in store, so deposited, he was taken rather unwell, and laid himself down in a field, in the parish of Scredington; when, from the heat of the season at that time, the meat speedily became putrid, and was of course struck by the flies: these not only proceeded to devour the inanimate pieces of flesh, but also literally to prey upon the living substance; and when the wretched man was accidentally found by some of the inhabitants, he was so eaten by the maggots, that his death seemed inevitable. After clearing away, as well as they were able, these shocking vermin, those who found courage conveyed him to Asbornby, and a surgeon was immediately procured, who declared that his body was in such a state, that dressing it must be little short of instantaneous death: and, in fact, the man did survive the operation but a few hours. When first found, and again when examined by the surgeon, he presented a sight loathsome in the extreme; white maggots of enormous size were crawling in and upon his body, which they had most shockingly mangled, and the removing of the external ones served only to render the sight more horrid.

sion it causes; but it is very different in the ill-peopled regions of America, where the waters stagnate, and the climate is warm, and where they are produced in multitudes beyond expression. The whole air is there filled with clouds of those famished insects; and they are found of all sizes, from six inches long to a minuteness that even requires the microscope to have a distinct perception of them.[*] The warmth of the mid-day sun is too powerful for their constitutions; but when the evening approaches, neither art nor flight can shield the wretched inhabitants from their attacks: though millions are destroyed, still millions more succeed, and produce unceasing torment. The native Indians, who anoint their bodies with oil, and who have from their infancy been used to their depredations, find them much less inconvenient than those who are newly arrived from Europe; they sleep in their cottages covered all over with thousands of the gnat kind upon their bodies, and yet do not seem to have their slumbers interrupted by their cruel devourers. If a candle happens to be lighted in one of those places, a cloud of insects at once light upon the flame, and extinguish it; they are, therefore, obliged to keep their candles in glass lanthorns: a miserable expedient to prevent an unceasing calamity![†]

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[*] Gnat Dances.—It may prove still more interesting, we think, to turn our attention to some other movements of insects which seem to be expressive of pleasure when they are not stationary, and leaving out of consideration, also, their foraging for food. A familiar instance of what we allude to occurs in the ærial dances of the tipulidan gnats and some other insects. These are performed not only in summer, but frequently even in winter and in the earlier months of spring,—in sheltered places, indeed, such as under trees and hedges, in lanes, and when a day chances to be finer than usual, though the mildest day is of course at these seasons comparatively chill. The most common of these winter dancers is called by Harris the tell-tale (*trichocera hiemalis*, Meigen), a troop of which may be occasionally seen gamboling in a sunny nook, though the ground be covered with snow. When the weather is warm and mild, however, the dancing *tipulidæ* prefer the decline of day; and we have remarked them keeping it up as long as we could distinguish them between the eye and the waning light of the western horizon: how much longer they continued to dance we cannot tell.

It is a very singular fact connected with these gnat dances, that the company always consists exclusively of males. This any person who will take the trouble may verify by inclosing a group of them in a butterfly-net. If this be not at hand, he may procure good evidence by wetting the hand, and passing it quickly amongst the thickest of the crowd; when several will be caught, and will uniformly exhibit the beautifully fringed or plumed antennæ, which in the female are without the hairs or the plumelets. What it may be, besides the same delighted and buoyant spirit which causes lambs to group together in their frolics, that induces those tiny gnats to sport in this manner on the wing, is perhaps, inexplicable.

Wordsworth's opinion, though adopted by Kirby and Spence, is, perhaps, as we shall presently endeavour to show, more poetical than correct. His words are:—

> "Nor wanting here to entertain the thought,
> Creatures that in communities exist,
> Less, as might seem, from general guardianship,
> Or through dependence upon mutual aid,
> Than by participation of delight,
> And a strict love of fellowship combined.
> What other spirit can it be that prompts
> The gilded summer flies to mix and weave
> Their sports together in the solar beam,
> Or, in the gloom and twilight, hum their joy."
>
> *The Excursion*

The evening gamboling of rooks on the wing, when they return from their more distant excursions during the autumn, may with more certainty be referred to this cause. White says, they rendezvous by thousands over Selborne-down, wheeling round and diving in a playful manner in the air, and when this ceremony is over, with the last gleam of light, they retire to the deep beech woods of Tisted and Kepley. It may not be improper, however, to distinguish between this and the restless tossing about and flapping of the wings, often exhibited by rooks previous to a storm, which more usually occurs in the morning, and closely resembles the tossing of sea-birds on the billows during a gale.

The quickness of the vision of tipulidan gnats, and the rapidity as well as the dexterity of their motion, may be considered not a little remarkable, from the circumstance of their flying unwetted in a heavy shower of rain, whose drops—bigger than their own bodies—if they fell upon them, must dash them to the ground; unless it may be that the drops glide off their wings as they do off the feathers of a duck, while the elasticity of their bodies may save them from accidents, even when they chance to be pelted.—Insect Transformations.

[†] Wheat-Fly.—The maggot of a minute fly of the same family, known by the name of the wheat-fly (*Cecidomyia Tritici*, Kirby), is frequently productive of great damage in

the crops of wheat. Its history was first investigated by Marsham, and subsequently by Kirby, and several other intelligent naturalists. The parent fly is very small, not unlike a midge (*Culicoides punctata*, Latr.), of an orange colour, and wings rounded at the tip, and fringed with hairs. The female is furnished with a retractile ovipositor, four times as long as the body, and as fine as a hair, for depositing her eggs, which she does in the glumes of the florets of the grain. The following account of its proceedings is given by Mr. Shirreff, an intelligent farmer of East Lothian:—

"Wheat-flies," he says, "were first observed here this season on the evening of the 21st of June, and, from the vast number seen, it is probable a few of them may have been in existence some days previous. The eggs were visible on the 23d, the larvæ on the 30th of that month, and the pupæ on the 29th of July. The flies were observed depositing eggs on the 28th, and finally disappeared on the 30th of July; thus having existed throughout a period of thirty-nine days.

"The flies were observed to frequent the wheat-plant, including the thick-rooted couch-grass (*triticum repens*). They generally reposed on the lower parts of the stems during the day, and became active about sunset, except when the wind was high. I have, however, seen them flying about on cloudy mornings, till seven o'clock, and, upon one occasion, witnessed them depositing their eggs, in a shaded situation, at two in the afternoon. Their movements appear to be influenced by the rays of light, of which they seem impatient, being active when the sun is below or near the horizon: they frequent the most umbrageous part of the crop, and shun that which is deficient in foliage.

"The flies almost invariably preferred the ears emerging from the vagina to those farther advanced, for depositing their eggs on; and as one side only of the ear is exposed when the plant is in this stage of growth, the other side generally remained uninjured. The fly deserted the fields as the crop advanced towards maturity, and were found longest on the spring-sown portion of the crop. It seemed to feed on the gum adhering to the newly emerged ears; and as there is a great diversity in the time of sowing wheat in this neighbourhood, and consequently of the ears escaping from the vagina, I attribute the unusual length of time it has existed this season, to the supply of food thus gradually furnished.

"The fly deposits its eggs with much intensity, and may easily be taken when so employed. Upon one occasion, I numbered thirty-five flies on a single ear; and, after carrying it a distance of a quarter of a mile, six of them still continued to deposit eggs. At another time, I placed a fly, then laying, between the face and glass of my watch, where it deposited several eggs, although invariably interrupted by the revolution of the moment hand.

"The eggs of the fly are generally found in clusters, varying in number from two to ten, upon the inner chaff, in which the furrowed side of the grain is embedded, and are also occasionally to be seen in the interior parts of the flower and chaff. The eggs are deposited by means of a long slender tube, and fixed with a glutinous substance possessed by the fly. A thread of glutinous matter frequently connects a cluster of eggs with the style, where the larvæ seem to subsist on the pollen; in one instance, fifteen eggs were numbered on such a thread, several of which were suspended on the portion extending between the chaff and the style. The fly not only seems thus to provide a conveyance from the larvæ to the style, but also food for their support. The anthers are prevented from leaving the style in consequence of being gummed down by the glutinous matter of the fly, and the pollen thereby detained for the use of the larvæ, which otherwise would, in part, be carried out of the glumes by the expansion of the filaments,—known to farmers by the term *bloom*. In the exertion of gumming down the anthers, many of the flies are entangled in the vascules of the corolla, and thus become a sacrifice to their maternal affection.

"The larvæ are produced from the eggs in the course of eight or ten days: they are at first perfectly transparent, and assume a yellow colour a few days afterwards. They travel not from one floret to another, and forty seven have been numbered in one. Occasionally there are found in the same floret larvæ and a grain, which is generally shrivelled, as if deprived of nourishment; and although the pollen may furnish the larvæ with food in the first instance, they soon crowd around the lower part of the germen, and there, in all probability, subsist on the matter destined to have formed the grain."—LOUDON'S MAG. OF NAT. HIST.

HESSIAN-FLY.—Our English naturalists were for many years of opinion, that the insect called the Hessian-fly, so destructive to wheat crops in America, belonged to the family *muscidæ*, with the common house-fly; and Mr. Markwick, an intelligent naturalist, by a series of observations on a British fly (*chlorops pumilionis*, Meigen) which attacks the stems of wheat, created no little alarm among agriculturists. Markwick's fly is less than a fourth of an inch in length, with dark shoulders striped with two yellow lines, and the maggot is white. He planted roots of wheat containing larvæ in a small flower-pot, and covered them with gauze. Each stem produced one of the above flies. The crop of wheat attacked by this maggot, though at first it appeared to fail, turned out well in consequence of numerous side shoots. It is only the early wheat sown in October that is affected by it.

It now appears that Markwick was altogether mistaken in identifying his insect with the Hessian-fly (*cecidomyia destructor*, Say), which has been accurately described by Mr. Say in the *Journal of the Academy of Natural Sciences of Philadelphia* for 1817. It is a little larger than our wheat-fly, more slender in the body, has longer legs, and is not orange, but black and fulvous. The female deposits from one to eight or more eggs on a single plant of wheat, between the sheath of the inner leaf and the stem nearest the roots; in which situation, with its head towards the root or first joint, the young larva passes the winter, eating into the stem, and causing it to break.

The devastation committed by the Hessian-fly seems to have been first observed in 1776, and it was erroneously supposed that the insect was conveyed among straw by the Hessian troops from Germany. It was first noticed in the wheat fields of Long Island, from which it spread gradually at the rate of fifteen or twenty miles round; and in 1789 it had advanced two hundred miles from its original station in Long Island. Other accounts state that it did not travel more than seven miles annually, and did little serious damage before 1788. Their numbers seem almost incredible. The houses in the infested districts swarmed with them to so great a degree, that every vessel was filled with them; five hundred were actually counted on a glass tumbler which had been set down for a few minutes with a little beer in it. They were observed crossing the Delaware river like a cloud; and even mountains do not seem to interrupt their progress. We can well understand, therefore, that so formidable a ravager should have caused a very great alarm; and even our own government was in fear lest the insect should be imported. The privy council, indeed, sat day after day in deep consultation what measures should be adopted to ward off the danger of a calamity more to be dreaded, as they well knew, than the plague or the pestilence. Expresses were sent off in all directions to the officers of the customs at the different out-ports respecting the examination of cargoes, — despatches were written to the ambassadors in France, Austria, Prussia, and America, to gain information,—and so important altogether was the business deemed, that the minutes of council, and the documents collected from all quarters, fill upwards of two hundred pages.

As in the case of the English wheat-fly, the American Hessian-fly has a formidable enemy in a minute four-winged fly (*Ceraphron destructor*, Say), which deposits its eggs in the larvæ. Were it not for the Ceraphron, indeed, Mr. Say is of opinion that the crops of wheat would be totally annihilated in the districts where the Hessian-fly prevails.—Insect Transformations.

Cheese-Fly. — Those who have, from popular associations, been accustomed to look with disgust at the little white larvæ common in cheese, well known under the name of *hoppers*, will be somewhat surprised to hear the illustrious Swammerdam say, "I can take upon me to affirm, that the limbs and other parts of this maggot are so uncommon and elegant, and contrived with so much art and design, that it is impossible not to acknowledge them to be the work of infinite power and wisdom, from which nothing is hid, and to which nothing is impossible." But whoever will examine it with care, will find that Swammerdam has not exaggerated the facts.

The cheese-hopper is furnished with two horny claw-shaped mandibles, which it uses both for digging into the cheese and for moving itself, being destitute of feet. Its powers of leaping have been observed by every one; and Swammerdam says, "I have seen one, whose length did not exceed the fourth of an inch, leap out of a box six inches deep, that is, twenty-four times the length of its own body: others leap a great deal higher." For this purpose it first erects itself on its tail, which is furnished with two wart-like projections, to enable it to maintain its balance. It then bends itself into a circle, catches the skin near its tail with its hooked mandibles, and after strongly contracting itself from a circular into an oblong form, it throws itself with a jerk into a straight line, and thus makes the leap.

One very surprising provision is remarkable in the breathing-tubes of the cheese-maggot, which are not placed, as in caterpillars, along the sides, but a pair near the head, and another pair near the tail. Now, when burrowing in the moist cheese, these would be apt to be obstructed; but to prevent this, it has the power of bringing over the front pair a fold of the skin, breathing in the meanwhile through the under pair. Well may Swammerdam denominate these contrivances "surprising miracles of God's power and wisdom in this abject creature."—Insect Trans.

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GOLDSMITH'S

NATURAL HISTORY,

WITH NOTES

FROM ALL THE POPULAR TREATISES

THAT HAVE BEEN ISSUED SINCE THE TIME OF GOLDSMITH:

COLLECTED WITH THE UTMOST CARE:

COMBINING

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FORMING

A COMPLETE VADE-MECUM OF MODERN DISCOVERY IN THE

SCIENCE WHICH IT ILLTSTRATES.

WITH A LIFE OF OLIVER GOLDSMITH.

BY GEORGE MOIR BUSSEY.

> "Some one told Dr, Johnson that Goldsmith was engaged in writing a work on Natural History. 'Is he so engaged?" said the great lexicographer,—'then he will produce a work on the subject as pleasing and delightful as a fairy tale.'"

By HENRY INNES,

AUTHOR AND EDITOR OF VARIOUS WORKS ON EDUCATION.

JOHN LOFTS, 262, STRAND, LONDON.

PREFACE.

The present edition of this standard and excellent production is called into existence by the extensive demand for works on NATURAL HISTORY, a stimulus having been given to the cultivation of this science, quite unprecedented. No apology is necessary for incorporating it with the cheap and useful literature, comprising the series entitled "THE STANDARD ILLUSTRATED LIBRARY," which has met with such extensive and deserved encouragement; and the language of Goldsmith, in his Preface to the original edition, in attacking the dry and tedious labours of scientific system-makers in Natural History, will supersede the necessity of any exposition of the design and object of the work. "It is written," says the author, "with only such an attention to system as serves to remove the reader's embarrassment, and allure him to proceed. It can make no pretensions in directing him to the name of every object he meets with; that belongs to works of a different kind, and written with very different aims. It will fully answer the design, if the reader, being already possessed of the name of any animal, shall find here a short, though satisfactory, history of its habitudes, its subsistence, its manners, its friendships, and hostilities. The aim has been, to carry on just as much method as was sufficient to shorten the descriptions by generalizing them, and never to follow order where the art of writing, which is but another name for good sense, informed me that it would only contribute to the reader's embarrassment."

It has been the careful object of the Editor to expunge the errors, and condense the text of the original, without marring the fascination of the narrative—and (which is the characteristic of this edition) to combine with it, in the shape of illustrative Notes, all the information which has been elicited by the advance of the science since Goldsmith wrote. These Notes, it will be found, equal, or exceed, the original.

This has been characterised as the age of cheap literature: this is unquestioned. It would be better for the prospects of society, if the utility of the works passed into extensive circulation bore any proportion to their demand. The advantages resulting from the study of Natural History need not be substantiated at this hour of the day; and it may be questioned whether an illustrated work exists containing such a mass of popular and useful knowledge, *at such a price*, as that now put forth.

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⁂ The preceding forms the Index to only so much of the text of Goldsmith as relates to the Quadrupeds. In addition, a GENERAL INDEX includes the many hundred species unnoticed by Goldsmith, and in no other edition of his Natural History, described and illustrated here.

AN EASTERN SCENE.

To face Page 1 of Birds.